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London
3/14





THE LONDON
Journal of Arts and Sciences.
FOR 1823.

An Original Work,
EXHIBITING

The Progressive advancement of Practical Science
in the various branches of

ARTS, MANUFACTURES & AGRICULTURE.

VOL. V.

LONDON;

Published by Sherwood Neely & Jones, Paternoster Row; & W. Newton, 66 Chancery Lane.

NOTES, LEXON AND
TILBEY REPARATIONS.

THE
LONDON JOURNAL
OF

Arts and Sciences;

CONTAINING

REPORTS OF ALL NEW PATENTS,

WITH A

DESCRIPTION OF THEIR RESPECTIVE PRINCIPLES AND PROPERTIES:

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ON SUBJECTS CONNECTED WITH

SCIENCE AND PHILOSOPHY;

PARTICULARLY SUCH AS EMBRACE THE MOST RECENT

INVENTIONS AND DISCOVERIES

IN

PRACTICAL MECHANICS.



VOL. V.

LONDON:

PUBLISHED BY SHERWOOD, JONES & CO. PATERNOSTER ROW;
AND W. NEWTON, CHANCERY LANE.

1823.

SHACKELL AND ARROWSMITH, JOHNSON'S-COURT, FLEET-STREET, LONDON.

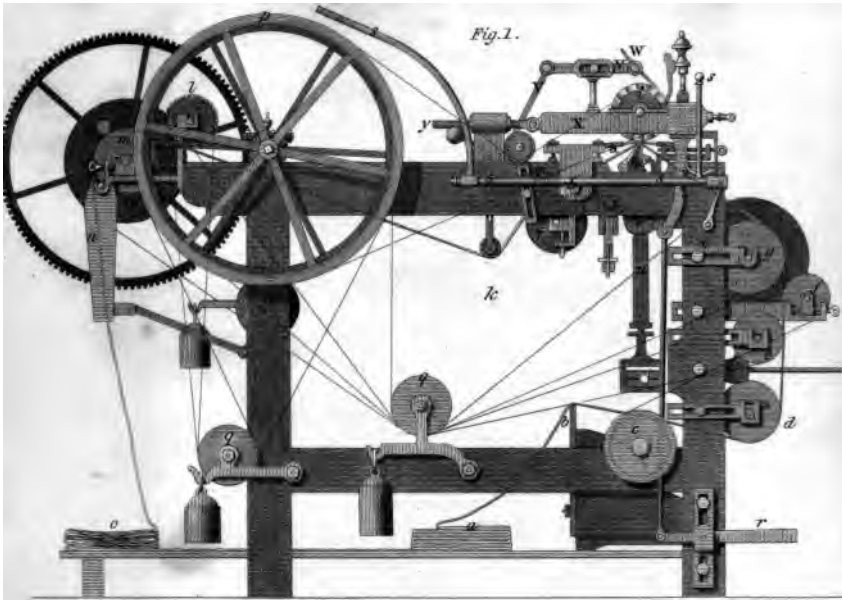
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FILED NEW YORK
JAN 10 1963
FBI - NEW YORK

RECEIVED
JAN 10 1963
FBI - NEW YORK

Cotter's Machine for Shearing Cloth.



Tyer's Improved Water Valve.

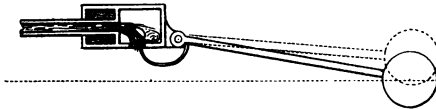
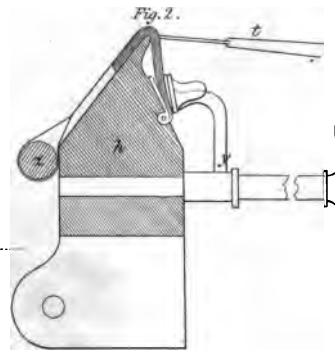
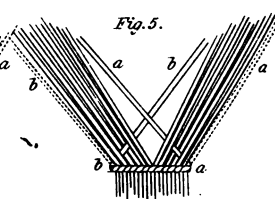
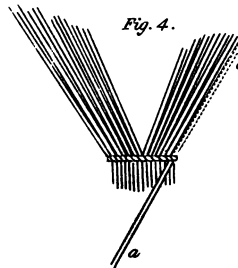
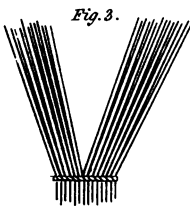


Fig. 2.



Lane's Improved Straw Plat.



J. Bacon sculp!

THE
London
JOURNAL OF ARTS AND SCIENCES.

No. XXV.

Recent Patents.

To JOHN COLLIER, of Compton Street, Brunswick Square, in the County of Middlesex, Engineer; for an Invention, of certain Improvements upon Machines, for shearing Cloth.—Sealed 27th September, 1822.

THIS invention consists of certain variations, additions, and improvements, upon machines now in use, for shearing or cropping the pile, from woollen and other cloths. The improvements apply principally to an apparatus, for which the inventor obtained his late majesty's letters patent, dated 15th January, 1818, (commonly called the French shearing machine) the general form and arrangement of parts, being the same, both in this, and the former. In order to render the present improvement obvious, it will be necessary to state generally the construction of the previous machinery. Plate I. Fig. 1, is a side elevation of the shearing frame, with its rollers, levers, and cutter. The cloth intended to be shown is to be

laid in a heap regularly folded, as at *a*. The upper end of the parcel about to be operated upon, is first conducted over the edge of the regulating board, *b*; and from thence over the top of the preparing cylinder, *c*, and under the conducting cylinder, *d*. From thence it passes between the cylindrical brush, *e*, (employed for clearing the bark of the cloth,) and the pile-raising cylinder, *f*; then over the delivering cylinder, *g*, to the bed, *h*.

Here the cloth passes between the bed and the cutting cylinder, *i*, which, being made to revolve, by means of any first mover, causes the spiral knives to act against the ledger blades, in a similar manner to the two edges of cutting shears, by which the pile on the face of the cloth becomes cropped or shorn. From the bed, the cloth passes over a conducting cylinder, *j*, and under the stretching roller, *k*, to the brushing or finishing cylinder, *l*, and is thence discharged over the cylinder, *m*, into the hopper, *n*, by which it is finally delivered on to the platform in regular folds, at *o*, by means of the crank, which produces a vibratory motion of the hopper.

As the two extreme ends of the piece of cloth are sewed together, its entire length may be operated upon; and, should it be required to pass the cutters more than once, it will be only necessary to move the parcel of cloth from its situation, at *o*, to the place in which it was first stationed, at *a*, and to turn it the other side upwards.

The power for working this machinery, is to be applied to the large rigger, *p*, which is formed by two concentric drums, one fixed to the shaft, the other loose, for the purpose of putting the machine in and out of gear; and the several cylinders are made to revolve upon their

axles, by means of bands and wheels connected thereto. *q, q,* are small riggers, hung in levers, with weights, for the purpose of drawing tight the several cords or bands: *r,* is a treadle connected by a rod on each side of the machine, by which the cutting cylinder may be instantly raised off the bed, so as to suspend its operation; and *s, s, s, s,* is a curved lever acting upon the band of the large rigger, *p,* for the purpose of throwing it in and out of gear, by which the whole machinery is put in motion, or stopped in a moment.

The improvements claimed in the present patent consist of the following additions: 1st, The cylinder, *c,* is to be covered with wire cards or with bristles, the object of which is to separate the pile, and bring it into a fit state for shearings; and, as this cylinder revolves in an opposite direction to the progress of the cloth, it acts as a brush to cleanse it from dust and other impurities, which are received into the box or trough below.

The cloth, in proceeding from the folded heap towards the preparing cylinder last mentioned, passes over the top straight edge of the board, *b,* which is adjustable by screws, and capable of being raised or lowered so as to cause the cloth to press with more or less force against the preparing cylinder, as circumstances may require. The cylinder, *d,* is merely to change the direction of the cloth: and the 2d part of the improvement is the cylinder, *e,* covered with bristles, to clear the back of the cloth from any loose matter which may adhere to it. The pile is raised by the cylinder, *f,* which is covered with plush or bristles, constituting the 3d part of the improvement; and the cloth is conducted by the delivering cylinder, *g,* to the cutter.

The bed consists of a bar of wrought or cast iron or other metal, the upper edge of which is perfectly straight

from end to end : a cross section or profile of the bed is shewn at Fig. 2, considerably enlarged. *t*, is the spring piece holding the cloth against the edge of the bed bar. The bar itself has no elasticity, and must be even and firm; it is, therefore, mounted upon, or supported by, substantial braces, *u*, Fig. 1, and is also affixed to the sides of the frame by pivots. A rebate, or sunk groove, is formed on one side of the bar, throughout its entire length, of sufficient capacity to contain a straight wire, which holds a double glazed linen or silk cloth, backed by a thickness of leather, and which is secured by a plate or slip of thin metal attached to the bar, in front of the wire. This thickness of glazed cloth and leather is turned over the edge of the bar, and drawn tight by a straight rod of iron connected to it on the opposite side, *x*, Fig. 2. Under the glazed cloth and leather, several thicknesses of velvet or other soft substances are placed, in order to afford an elastic bed. These thicknesses of cloth and leather are attached on one side to a long slip of brass, by means of which the whole of the coverings may be made to slide laterally upon the metal bar, the shifting being effected by hand, by the small arms, *y*, or an endless chain may be attached thereto, passing over pulleys, to be moved by a rack and pinion. The object of this lateral motion is, to accommodate the width of the cloth to be shorne, by shifting the coverings from either end of the bed bar, so as to allow the list to sink away from the operation of the cutter.

Raising the handle, *z*, causes the bed bar to turn upon its pivots, by which it may be instantly withdrawn from the cutters; but, when the handle is made fast, the accurate adjustment of the bed bar is effected by screws at bottom of the braces, *u*.

The cloth, in passing over the bed, is operated upon

by the cutters, the lowest or ledger blade of which, *a*, is perfectly flat and straight. The carriage of this blade turns upon pivots, *b*; but may be made fast by set screws, which adjust it to the table. The upper or revolving cutter, *i*, is made of wrought or cast iron or steel; and after it has been turned truly cylindrical, spiral grooves are cut in its surface, about eight in number; and so formed, that each groove goes about four times round the cylinder, in passing from one end to the other. Into these grooves, cutting blades, of the best thin plate steel, are introduced, not projecting more than half an inch above its surface. Instead of fixing these blades in their places by blocks of wood or pewter, as heretofore, it is now proposed to introduce into the spaces between each blade, long slips of brass, which shall wind round the cylinder, but taper towards the blade on one side: these slips are made fast to the cylinder, by screws at short distances. The cutting cylinder, so formed, must then have its edges properly prepared, by grinding, so as to be of a true cylindrical shape; for upon the accuracy of the cutter, chiefly depends the operation of shearing.

It is necessary to supply the edges of this cutting cylinder with grease, to assist its operation; for which purpose, a strip of stout leather is placed over the cylinder, as at *w*; which being supplied occasionally with oil, communicates it to the edge of the cutter. This greaser is not kept in contact with the edges of the cutter, but is made to touch it occasionally, by means of pins upon the end of the cylinder, *g*, which strike, as the cylinder revolves against the end of a compound lever, *v, v, v*, which carries the greaser, the principle part of this lever being shewn by dots.

The pivots of the cutting cylinder are carried by arms,

x, and the adjustment is effected by screws, *y*; it is made to revolve, by a band, from the large rigger. The cloth, in passing from the bed and cutters, goes over a cylinder, *j*, and roller, *k*, and then passes under a soft brush, or finishing cylinder, *l*, which, by moving much faster than the cloth, though in the same direction, has the effect of laying and smothering the pile, removing any shearing dust, or flocks, that may adhere, and finishing the cloth in a superior manner. From thence it is drawn off by the discharging roller, covered with plush, and conducted down to the hopper *n*, as before described.

This machine is calculated to shear cloth from end to end; but there is a mode proposed of adopting a cutter, so as to shear from list to list. This is by means of a fan-formed cutter, with inclined blades, which, instead of revolving, is made to oscillate: this mode, however, does not appear to possess any advantages over the revolving cutter; nor, indeed, to be equal to it. The patentee states, that it will not perform so well as the revolving cutter, from the violence of its action, if it travel over the cloth, as is usual when shearing from list to list; but it produces a new and desirable effect, if the cloth is made to move over the table, the cutter retaining its situation.

Involved October, 1822.

*To JOHN WHITCHER, of Helms Row, Old Street, St. Luke's, in the County of Middlesex, Mechanic;
 MATHEW PICKFORD, of Wood Street, in the City of London, Common Carrier; and JAMES WHITEBORN,
 of Goswell Street, in the aforesaid County, Coach Smith;
 for an Invention of an Improvement in the Construction*

*For the Improvement in the Construction of Wheels. T
of the Wheels of all wheeled Carriages, and of all other
vertical Wheels of a certain Size.—Sealed September
27, 1822.*

THIS invention is an arrangement of anti-friction rollers, for the purpose of reducing the friction which would arise, from the pressure of the axle, against the interior of the box of the wheel. It is stated to consist in “the application of friction rollers, of a certain proportional dimension, connected together, and revolving upon, outer and inner circles; the circumference of which circles, must bear the same proportion to each other, as the circumference of the rollers bear to each other.”

Plate II, fig. 1, is a representation of the system of rollers, and the circles round which they revolve. These are intended to be contained within the box of the wheel. Fig. 2, is a section of the same, taken vertically; *a a*, are two circular plates or rings of metal, (iron, case-hardened, is preferred,) fixed, by screws or bolts, to the wood-work of the nave, which are called the outer circles: *b* is the axle, with two circular plates or ledges, formed upon it, constituting the inner circles: *c, d, c, d, c, d, c, d*, are five pairs of double rollers, their two different peripheries, *c* and *d*, being intended to work respectively upon the outer and inner circles; or there may be distinct rollers, of different radii, instead of double ones. These rollers revolve upon axles, which pass through a middle ring, and thereby keep them connected at their proper distances.

In order to render the object of the present invention perfectly evident, the patentees have described former contrivances, intended for the reduction of axle friction, and pointed out their defects. Let *a*, fig. 3, represent

the axle of a wheel, which turns upon, and forces round, the two friction rollers, *b* and *c*; as the axle, *a*, only touches the rollers, *b* and *c*, in points, the friction at their circumference is trifling; but the weight of the axle, rests upon the pivots of the friction rollers; and there, consequently, a considerable friction is experienced. In fig. 4, *a*, represents the axle; *b* and *c*, are wheels, placed for the purpose of keeping the axle, *a*, in a proper position, and the whole weight rests upon the pivots of the friction roller, *d*. In this figure, there is the same objection as in the last; viz. the great friction at the centre *d*.

To prevent the friction at the pivots of the rollers, a contrivance, something like that herein proposed, has been employed, where the peripheries of the rollers, as they successively come under the axle, act against a circular plate or ring; by which the weight is transferred to the outer circle. This may appear to have the effect contemplated; but it will be found, that if the circumference of the circle, *a*, fig. 5, be half that of the circle, *b*, then the rollers, *c*, *c*, *c*, *c*, *c*, *c*, in revolving round *a*, would *drag* over half the circle, *b*; because any given periphery of the roller, *c*, has to pass over the two surfaces, *a* and *b*, of unequal lengths, in the same space of time; and, consequently, by dragging the rollers over the surface of *b*, a great increase of friction will be created, instead of being reduced.

The removal of this objection is the object contemplated under the present patent; where, instead of the anti-friction rollers last mentioned, it is proposed to employ two rollers of unequal diameters, or a double roller, *c*, *d*, fig. 1 and 2; the respective peripheries of which are made commensurate, to the circumference of the outer and inner circles, *a* and *b*; by these means, the periphery

of the larger roller will revolve round the outer circle, in precisely the same space of time that the smaller roller takes to travel round the inner circle.

The specification states, " we consider this mode of using the combination of friction rollers, above described, to be the best ; but it may be used, and we have used it, in another manner ; namely, without any pivots or axles to the friction rollers, but by using cogs, thus : let the middle ring be removed, and the larger periphery of the roller, instead of being grooved, as it is at present, be flat ; and let such flat surface be covered with cogs, running and fitting into cogs all round the interior of the outer circle ; and the same with the lesser periphery of the friction rollers, and the inner circle : the cogs would then be sufficient to keep the rollers at the proper distances from each other."

This system of anti-friction rollers, may be employed in a box, which shall be fixed on the side of a carriage, or to machinery ; in which case it is considered, that the axle itself revolves, and passes through the centre of the box. When employed in any way that may subject the rollers to the intrusion of dirt and dust, a casing is to be placed over the box, made of iron, or any other sufficient covering. " We hereby declare, that we consider this improvement to be applicable to all vertical wheels, the diameters of which are less than one inch."

Inrolled, November, 1822.

*To JOHN WILLIAMS, of Cornhill, in the City of London,
Stationer ; for a Method to prevent the frequent removal
of the Pavement and Carriage Paths ; for laying down,*

and taking up, Pipes; and for other Purposes, in Streets, Roads, and Public Ways.—Sealed October 18, 1822.

THE object of the patentee is to construct tunnels, or subterraneous passages, under the public streets, for the purpose of receiving the pipes employed by the different water and gas companies; by which he intends to supersede the necessity of removing the paving stones, when repairs of such pipes become necessary. These receptacles are to be called *SUBWAYS*, and are described as being formed of different dimensions and shapes, suited to the situations in which they are constructed.

It is proposed to open the ground, in the first instance, to the required depth, perhaps ten feet below the surface, and five feet wide; then to lay a course of bricks, stones, or iron, nearly level, so as to cover the bottom of the trench; from which, drains are to communicate with the sewer. On each side of this trench, a wall is to be erected, about five feet high, and from them an arch is to be thrown over the trench, leaving the height of the central part about seven and a half feet. At every twenty-five feet distance, an opening is to be made in the wall, nine inches wide, and three feet above the base of the trench; from these openings, branching tunnels are to be carried to the sides of the street; and, at their ends, doors or gratings are to be placed, opening from the inside. Similar openings are to be made in the top of the arch, at the distance of a hundred feet apart, for the admission of light and air; and door-ways are to be formed in the sides of the wall, near these openings.

The subways are to be entered by doors and passages in the sides, leading from the houses, in the same manner as the entrances of vaults that are under the street. In

Lane's, for an Improvement in the platting of Straw. 11

these passages the main pipe of the water and gas companies, are to be placed upon iron cradles, and the branch, or service pipes, for the supply of the houses, are to pass, from the mains, through the side tunnels, or openings, above described. These subways may be formed double, that is, passing under the road, parallel to each other; the one for water-pipes, the other for gas-pipes. "From these sub-ways, access may be had into the sewers and drains, or springs and wells of water, for their original construction, by tunnelling, or otherwise, and for repairing them; and also, generally, for almost every other purpose for which the pavement and carriage paths in streets, roads, and public ways, have hitherto been opened."

Inrolled, December, 1822.

To URIAH LANE, the Younger, of Lamb's Conduit Street, in the United Parishes of St. Andrew, Holborn, and St. George the Martyr, in the County of Middlesex, Straw Hat Manufacturer, for an Improvement in the platting of Straw, and manufacturing Bonnets, and other Articles, therefrom.—Sealed October 18th, 1822.

THIS patent is for a new method of plaiting split straws, by which an article is produced, for the manufacture of hats and bonnets: of an appearance and quality superior to every other description of straw plait hitherto made.

The plaiting is to be performed by the hands of women and children, as usual, but the particular method of placing the straws, constitutes the invention. A quantity of single split straws are to be fastened together, at that end called the white or clean end. Suppose

invention. It is stated, that, in consequence of the straws being twisted, and turned upon the edges of the plait, in the peculiar manner described, the fabric is much stronger than it would be if turned in the ordinary way; and it is presumed that a bonnet, made in this manner, beside its superior elegance, will wear much longer than one made from other kinds of split straw plait, which is sewn together.

This description of plait may be made with a greater or less number of straws, and may be varied in appearance, by turning the straws under and over a greater or less number of splints: the patentee, therefore, states "I claim, as my invention, every variation of split straw plait, which can be produced with single straws, upon the principle of having one side made entirely of the outside, or bright surface, of the straw."

Inrolled, December, 1822.

To WILLIAM HUXHAM, of Exeter, in the County of Devon, Iron-founder, for certain Improvements in the Construction of Roofs.—Sealed 4th June, 1822.

THESE improvements apply to cast-iron roofs, and the iron rafters of which such roofs are formed, and consist in the addition of plates or caps of iron, to be attached to the rafters, for the purpose of lapping over the edges of the slates, or other materials, by which the roof is covered in. The rafters are proposed to be cast with a rib in the middle of their upper surface, by which a rebate is formed on each side, for supporting the edges of the slates, and when the slates are placed in the

rebates of the rafters, the plates or caps are to be laid and fastened upon the middle ribs by bolts or screws. A rib is also proposed to be cast on the under side of the rafter, for the purpose of increasing its strength.

The cross sectional figure of the cap may be either flat or curved, as shall best suit the form of the rafter; it will be flat if the rafter has a middle rib, but if the rafter be cast with a level surface on its top, then it will be necessary to bend up the edges of the cap, either in a curve, or by a double angle or rebate, so as to leave a space for the edges of the slate, or other coverings of the roof, to lie.

Holes are cast through the rafter, and through the caps, at certain distances, for the purpose of passing the screw bolts, by which the caps are intended to be secured to the rafters. The slates or other materials, by which the roof is covered in, are to be imbedded with cement. The specification concludes with the following observations.

"The principal advantages of my said invention, I consider to be the better securing of the slates or other coverings in their places, and the strengthening of the rafters by the union of the caps thereto, by means of the screws, as aforesaid. I do not mean or intend hereby to claim, as my invention, the employment of cast-iron rafters; but I do hereby claim, as my invention, the said cast-iron caps, and the mode of fixing them to the rafters, as above specified."

Inrolled, December, 1822.

such a height as it is readily susceptible of; nor would there be found any difficulty in keeping the temperature of the fluid metal so raised to perform its operations.

“Indeed, by carrying these principles to a greater extent, the necessity of a boiler may altogether be obviated; and the steam produced at once, by the injection of small quantities of boiling water, from time to time, into a small inverted receiver, in the heated medium; from whence it would be carried to the proper part of the revolving wheel, or bucket, or other receiver in which it is to act, according to the particular construction of the engine: and in which inverted receiver, the steam, from the rapidity of its generation, must be created at a much less expense of fuel, than in any of the ordinary processes of the boiler; wherein, as the generation is comparatively so much slower, there is consequently so much more time even for the loss of heat by radiation. In fact, whether this heated medium operates by increasing the volume of steam ready formed in a separate boiler, or in the immediate generation of it, without a separate boiler, the increased volume in one case, and the entire generation in the other, are effected in the very same moment that the steam produced is brought into action; and, consequently, without allowing any interval of time for the loss of heat.”

“In the present state of this novel and rapid mode of producing and applying the force of steam, it is, indeed, impossible to say, to what extent of power the effect may be carried, in proportion to the fuel consumed. It is evident, however, that so far from any possible condensation taking place in the steam from the time of its generation to that of its action, the tendency of this mode of applying it is that of a continued accession of temperature.”

other hand, by working with the medium in a close vessel, and applying a condenser to exhaust the steam as it rises to the surface of the medium, a still further expansion of the steam, and consequent increase of power, may be obtained with a given temperature and given means, by thus removing the incumbent pressure of the atmosphere."

"The importance of these new principles will at once be understood by those who are versed in these matters, as they will perceive (taking one instance only, by way of example,) that, by working the simple rotatory engine of my invention, formed by the immersion of a common hydraulic wheel, (as described in the first case in the specification of my above-mentioned patent) in a medium, the specific gravity of which to water, shall be as ten to one, a small wheel of two feet in diameter in such a medium will be impelled by steam of the same pressure, as a wheel of twenty feet in diameter, working in boiling water: and, consequently, that whereas, to obtain the same pressure as that of the steam of a common condensing engine, from steam working on this principle, in a medium of boiling water, would require a machine of very large dimensions, this same effect may be produced in a heavier medium by a machine of very moderate dimensions indeed."

By working the steam in a medium of high temperature, the size of the boiler may be reduced, and a considerable saving of fuel effected; for the volume of steam from a small boiler, will be very rapidly increased by these means, to the extent of three or four-fold, without the medium being raised to any very high temperature; and a still more rapid evolution of steam would take place by raising the temperature of the metallic medium to

To ELIZABETH PECK, of Liverpool, Lancashire, Merchant ; for the invention of certain Machinery, to be worked by Water ; applicable to the moving of Mills, and other Machinery of various descriptions ; or for forcing, or pumping Water.—Sealed 22d February, 1822.

THIS invention is a wheel with swinging floats ; and is intended to be immersed entirely below the surface of the water, with its axis either in a vertical or horizontal position ; or, indeed, placed at any angle with the surface of the stream. Plate II. Fig. 6, shows the wheel in a vertical position ; and Fig. 7 the same in a horizontal position. Fig. 8 is a section of the wheel, with its floats and chains as they would be situated, if the wheel was in action, its axis being horizontal, as at Fig. 7. *a, b, c, d, e, f, g, h*, are eight floats or flaps, made of thin sheet metal, swinging upon pivots, which pass through the arms of the wheel. It will be seen that as the wheel revolves, these floats or flaps would fall over on either side of the arms, by their gravity, if they were not restrained by check chains ; which are fastened at one end to the front edge of the flaps or floats, and at the other to the back edge of the float immediately before it.

These chains restrain the action of the floats, so that they cannot, at any time, form an angle of more than 135 degrees, with the arms on which they swing, while they do not interfere in any way with the centrifugal action of the flaps as the wheel revolves.

“ If we imagine (says the patentee) a current of water in which the wheel is placed, to be running from *o* to *p*, it is evident that the flaps *a* and *b* will be acted upon directly by the current, while the flaps *c* and *g* will be acted upon obliquely, and not quite so strongly, but all

Whitcher's Anti friction Axle.

PL. 1

Fig. 1.

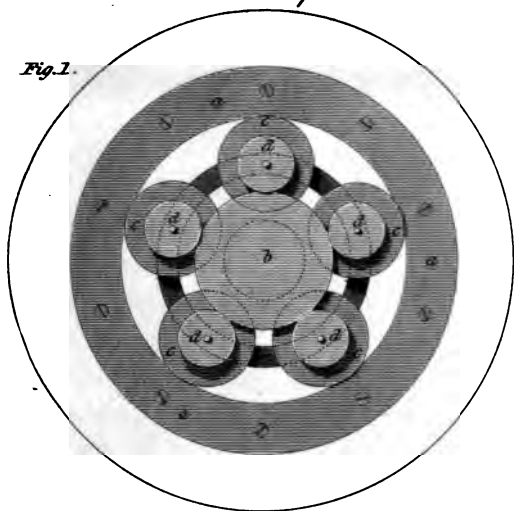


Fig. 2.

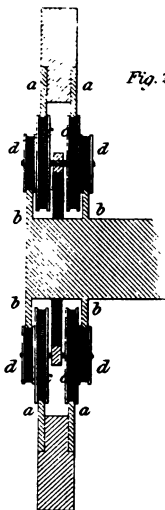


Fig. 5.

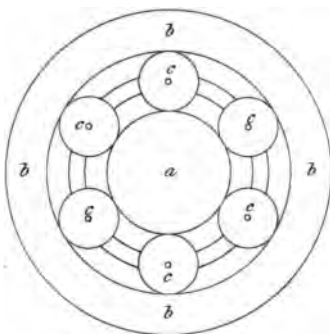


Fig. 3.

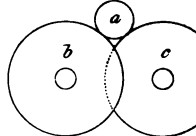


Fig. 6.

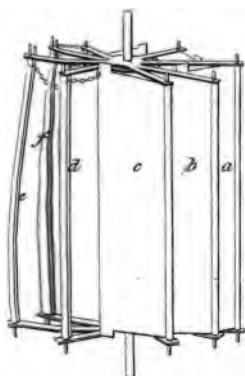
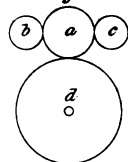


Fig. 4.



Peck's Water Wheel.

Fig. 7.

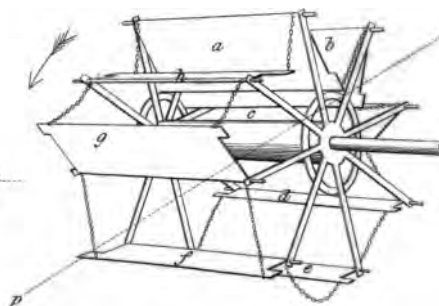
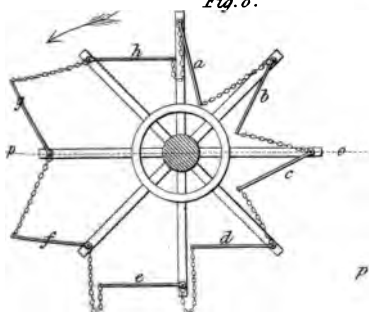
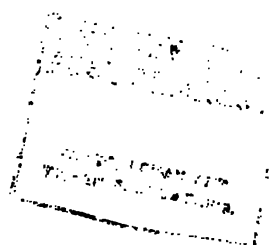


Fig. 8.



W. Newton del.

S. Gladw



four tending to turn the wheel in the direction of the arrow ; while the flaps, *d, e, f,* and *h,* will be nearly in an inactive state."

In this way it is intended that the current of water, in which the wheel is immersed, shall constantly exert a propelling force upon the four flaps, which come into the situation of *a, b, c,* and *g,* as the wheel revolves, while the flaps, *d, e, f,* and *h,* or those which fall into that situation, floating on the water, and lying nearly horizontal, will cause very little, if any, resistance, on the opposite side of the wheel; thus, the pressure of the current of water against the four flaps first named, will cause the wheel to revolve with considerable force, which, as a moving power, may be communicated to other machinery, by any of the usual modes of connexion attached to the axle of the wheel.

When the axis of the wheel is perpendicular, as at Fig. 6, the current of water will act upon the broad surfaces of the flaps on one side of the wheel only, while those flaps on the other side will, as the wheel revolves, accommodate themselves, and present only their edges to the stream. Thus, a revolution of the wheel would be produced, as long as the current continued running, and the wheel, in this position, will act either entirely, or partially, immersed according as the ebb or flow of the tide may raise or depress the water. The letters in this figure correspond to similar position of the flaps, as described above.

"Now, the said wheels may be made of any dimensions, or of any suitable materials, though I prefer cast or wrought iron. But such a water-wheel as is hereinbefore described, to be used in rivers, or other currents of fresh or salt water, and which acquires its greatest power when wholly immersed in such water, and the

axis of which may be placed either vertically or horizontally, or at an elevation, as may be best adapted to the situation in which it is to be used, being, to the best of my knowledge and belief, entirely new, and never before practised in these kingdoms, I am desirous to maintain this my exclusive right and privilege to the same."

Inrolled, July, 1822.

Original Communications.

To the Editor of the Journal of Arts, &c.

SIR,

THE attention of the public has lately been excited as to the comparative advantages of oil and coal gas : these subjects have appeared to me of great importance, both with regard to the chemical principles on which they respectively depend, as also to their beneficial results.

In the destructive distillation of wood, oil, or coal, the elementary principles of which they are composed become liberated, and new combinations arise : these combinations vary, according to the conditions of temperature to which the materials are exposed. Those who have had an opportunity of examining large establishments of pyroligneous acid, must have observed the various products from different combinations of oxygen, hydrogen, and carbon, being the constituent parts of wood. From different proportions of carbon and hydrogen we have tar, naphtha, and carburetted hydrogen ; we have carbonic acid from carbon and oxygen ; water from oxygen and hydrogen, and from a combination of the three elementary principles we have acetic acid. These results materially vary, according to the heat em-

ployed; when all the combinations are effected, what is left in the retort is carbon or charcoal.

From coal exposed to a similar process, we have tar, naphtha, ammoniacal matter, sulphuretted hydrogen, sulphuret of carbon, carbonic acid, and coal gas: and what is left behind is coke; so that in coal we have sulphur and azote, as well as the three constituent parts of wood.

The two combustible elements, viz. hydrogen and carbon, when in a gaseous form constitute the gas now so generally employed for illumination.

To the illustrious president of the Royal Society we are indebted, for an admirable elucidation of the principles of combustion; he has satisfactorily proved that the brilliancy of illumination, is in the ratio of the solid matter entering into the composition of the combustible material; this opinion is strongly supported by the combustion of the gaseous combination of hydrogen and carbon, the light evolved being in proportion to the carbon. Chemists, in general, suppose that we have two definite compounds of carbon and hydrogen; viz. olefiant gas, and the light hydro-carburet. Professor Brande, from a series of ingenious experiments, concluded that there is only one gaseous chemical combination of carbon and hydrogen, namely, that which is denominated olefiant gas; and that coal gas is an intermixture of hydrogen with this gas, but not in chemical combination. If this opinion were correct, we must infer that uncombined hydrogen may be produced, by the agency of heat on coal, I am not aware of any experiment, where hydrogen gas can be evolved, from any combustible substance, by the agency of heat alone; it is always liberated from one state of combination, to enter into another by a superior affinity.

According to Berzelius, olefiant gas is a compound of fourteen parts of hydrogen and eighty-six carbon, and its specific gravity, with respect to atmospheric air, 9894.

Coal gas, or light hydro-carburet, consists of 24.0 of hydrogen, and 75.4 of carbon, and its specific gravity is 559.

For the first production of olefiant gas, we are indebted to the Dutch chemists, Deiman and Trooshoyk, &c. By determining ether, through heated porcelain tubes, the gas evolved when mixed with chlorine gas formed an oily substance with a peculiar odour, and hence arose the term olefiant; they remarked, that the same results did not arise when vitreous tubes are employed; they inferred that the porcelaneous substance contributed to the decomposition.

If oil be determined through heated iron tubes, into which are introduced clay bricks, or any argillaceous refuse, a portion of carbon is abstracted from the oil, and the gas called oil gas is produced; and the clay bricks, &c. become impregnated with carbon, demonstrating the correctness of the Dutch philosopher's conjecture, that the tube they employed contributed to the decomposition.

So much influence has temperature in all these operations, that Dr. Henry has remarked that he obtained, at different times, from the same oil, gases of different specific gravities, from 464, 590, to 750. It does not appear that, from any experiment he produced, gas so nearly approaching olefiant gas, as that sent him from an oil gas apparatus in London: the gas was made from cod oil, and the specific gravity 906.

Although the decomposition of oil, naphtha &c. has been frequently repeated by different chemists, I am not aware that the suggestion of its being applicable to the

purposes of general illumination was ever made, prior to Mr. Taylor's experiments, and for the capability of its being so employed. I consider the public are indebted to this gentleman's exertions. It cannot be controverted that, by means of Mr. Taylor's apparatus, the gas produced is more uniform in its character, more pure in its principles, and more brilliant in its illuminating powers, than the gas commonly produced from coal. However superior oil gas is in these respects, yet if, in its production, the expence should greatly exceed that of coal gas, such would be a material objection to its being extensively employed. Those acquainted with gas establishments well know that little or no profit results from the prices at which street lamps are lighted; I shall, therefore, particularly direct my attention to the expence attending a street lamp being lighted with oil gas. Mons. Clermont, a celebrated French chemist, who has paid great attention to this subject, informed me lately, that, on an average, with different oils, the quantity of gas he produced was 800 times the volume of the oil employed. A cubic foot of oil gas weighs 484 grains, a cubic foot of oil weighs 441,600 grains; but 484, multiplied by 800, is equal to 387,200 grains of oil gas, leaving a loss of 54,400 grains, nearly one-eighth of the oil employed.

A gallon measures 231 cubic inches; and, according to the above calculations, will yield 107 cubic feet of oil gas: this, I believe, nearly corresponds with the results of Messrs. Taylor and Martineau. The price of oil is very fluctuating, varying from £20 to £30 per ton; taking the mesne at £25 per tun, it will be 2s. 1d. for 107 cubic feet, or 19s. 4d. per 1000 cubic feet.

The illuminating powers of oil gas, with respect to London gas, have been stated by Professor Brande to

be as 4,875 is to 13,120, resulting from experiments on the differential thermometer; viz. that the combustion of 4875 cubic inches of oil gas produced as much light as the combustion of 13,120 cubic inches of coal gas, not quite three times, being as 1 to 2,69: it is a curious fact that when those gases are employed in these proportions, so as to produce equal illuminations, the quantity of oxygen destroyed by the coal gas is nearly double of that consumed by the oil gas; one proof, amongst many others, that light and heat are not regulated by the same laws; and is a property of oil gas much in its favour, from the capability of employing a great light without the annoyance of a proportionate increase of temperature.

A street lamp should be estimated to be lighted, on an average, 12 hours per night, and a moderate size bat wing will consume 5 cubic feet per hour, or 60 cubic feet per night, being 21,900 cubic feet per year; according to the illuminating powers of oil gas, we shall require 7590 cubic feet of oil gas, or exceeding £7 per lamp per annum.

My experience, with respect to oil gas, has been very limited, and there may be errors in my data, of which I am not aware, I am desirous of making a liberal statement as to oil gas: it is a light I much admire. The present patentees are men of science. I am informed, they are now erecting a small apparatus in Bristol. If an opportunity should be afforded me of examining the process more minutely, I should readily embrace it, and as readily acknowledge, publicly, any errors in the present calculation.

In London, and in districts where coal is expensive, the difference in price may not be so great; in places like Bath and Bristol, surrounded by coal fields, the difference

of expence would be great indeed. It appears to me that, in all towns where coal can be procured at a less price than thirty shillings per ton, public lighting by oil gas cannot be contemplated.

An oil gas establishment is certainly less expensive in its formation than one of coal gas, I think I may say by nearly one-half; and the annual expences of the station are comparatively very trivial, either as to retorts, furnace, coal, or labour. Where only one-third of the gas is required, there is a proportionate reduction in the capacities of the gasometer and of the main pipes. I am induced to think that many towns have adopted oil gas from the fascinating circumstance of a less sum being at first required, without, perhaps, entering minutely into the future expences.

I believe, if an oil gas establishment could be confined to private lights, it would be productive; if the actual profit from 1000 private lamps should be only one-half of what would arise from coal gas, the dividends would be equal, for the capital required for the former would only be one-half of the sum requisite for the latter.

It ought to be observed that, in this estimate, I have not included any charges for fuel, labour, and wear of retorts, although in oil gas establishments these are not considerable, yet they all contribute to the expence of the gas. There is another objection which appears to me of equal importance; viz. the present price of oil. I consider it, at its minimum; in case of a war, the same oil could not be procured for £40 or £50 per tun. Upon what terms could oil gas, then, be made.

When coal gas is made in the new constructed retorts, which decompose the greater part of the tar, on the same principle oil is decomposed, a larger proportion of olefiant gas will be produced; and the illuminating power

in the same ratio increased: coal gas, in the common way, after the sulphuretted hydrogen, and carbonic acid gases have been removed, by the white carbonate of lead and potass, the purified gas examined by chlorine gives at a mean from 10 to 12 per cent. of olefiant gas; in the new constructed retorts the olefiant gas averages 20 per cent. It is the opinion of Dr. Henry, that coal gas allowed to pass over a long-heated iron surface, loses some of its illuminating powers, yet he remarks that the gas is increased in quantity, and carbon is deposited. If coal gas had been decomposed, there would be no increase in bulk: hydrogen resembles oxygen, although saturated with carbon, and in a gaseous form retains the same dimensions. 100 cubic inches of oxygen, combined with carbon, to form carbonic acid, still measure 100 cubic inches. The increase of bulk, remarked by Dr. Henry, arises from the liberation of the naphtha volatilised with the coal gas, which now being decomposed, carbon is deposited, and the bulk increased by an addition of olefiant gas. By this mode, the gas burns more like oil gas, and produces little or no carbonaceous discolorations; and with coal gas thus prepared, oil gas is not more than as two to one, with respect to illuminating power.

In all places where coal gas is introduced, the same arrangement of main pipes will answer for oil gas; in the reverse it would not. I am informed, that part of Paris is already lighted with gas, prepared from either linseed, or rapeseed, introduced into the retorts. I am not acquainted with the size of the retorts employed, or the quantity of seeds at each time introduced. With a small experimental retort, I have tried linseed, and the gas produced was very brilliant. I merely put the seeds in the retort, without any apparatus for the abstraction of

carbon from the oil of the seeds : perhaps, the solid part of the seed might suffice for the same purpose, as in some oil establishments coke is introduced instead of argillaceous substances.

It is no wonder that so important a principle as gas, from which we experience so much protection, and derive so much comfort, should have excited the attention of the most able chemists and mechanics. I am persuaded, that we may look forward to the period not being very remote, when the same fire which is subservient to the culinary purposes of every house, may also be the medium of its internal illumination.

I am, Sir, your obedient servant,

Bath ; November 21, 1822.

C. H. WILKINSON.

To the Editor of the London Journal of Arts.

SIR,

A prospectus being issued by Mr. Williams, of Cornhill, for the establishment of a "City of London Patent Sub-way Company,"* I take the liberty of troubling you, as one of the conservators of the public understanding, with the following observations.

It so happened that, some three or four years back, the same subject arose in conversation with a gentleman much accustomed to consider the evil which this scheme proposes to remedy ; and he then stated, that the only way of preventing the pavement being broken up was, to construct brick tunnels, under the narrow sides of the carriageways, to receive the several pipes ; and I have still in my possession sketches made about that time by myself, while considering the subject more attentively. The suggestion appeared all very pretty upon paper, and

* See Williams's Patent, page 9.

might be very plausibly argued upon ; but, happening to know a little of business, I soon perceived that, even if all contending interests could be lulled asleep in happy dreams of future comfort and emolument, the expence would be too enormous to be encountered with one's eyes open.

This statement, which I can readily substantiate, informs you that it is by no means a singular idea. I need not then further enlarge upon this head, but proceed to consider the patent and the prospectus.

The arched ways, as described, are not large enough. A very few pipes would choak up the gangway. Of the nine-inch openings, the tunnels to the sides of the streets, and so forth, I do not clearly comprehend the use, and only observe, that the gratings in the top of the arch will admit just as much dirt as light. The capital proposed to be raised is one hundred thousand pounds. Perhaps this may go a little farther than from Temple Bar to Aldgate pump with one tunnel, should the company be fortunate, but will be very inadequate to the re-construction of all the roadways of the metropolis. Within the last seven years the New River Company must have expended immense sums in laying down iron pipes, which may not want renewal or much repair during the lives of the present proprietors. Within the last seven years the Commissioners of Sewers must have expended much money in rebuilding ancient sewers and so forth, which may now endure for centuries ; and the Commissioners of the Pavements must, within the same period, have, for all the hostile proceedings of Gas and Water Companies, liquidated extraordinary expences, which may not recur for many years ; yet, Messieurs—the Sub-way Gentlemen, very modestly ask only an annual remuneration, equal in amount to the

average expenditure of the seven years. As regards the sewers, their views are confined to the "opening, shoring, and closing the streets, roads, and public-ways" only, an expence which, in itself, may not in future be very great; and as they only "propose to receive into their sub-ways," not themselves to alter the present pipes; and only "engage to preserve the highways" "after they are once properly laid down to *their* satisfaction," and not themselves to re-pave all the streets pulled to pieces by their own proceedings, I must confess myself not much disposed to admire their disinterestedness.

The advantages promised to the public are not quite so apparent to me, as to the projector. The Gas and Water Companies, are, undoubtedly, not very ceremonious in their proceedings; but, I should apprehend their mole-tracks will not be much more inconvenient than this wholesale ditch-making. The Gas and Water Companies would, no doubt, inform us that they make their pipes not so much to bear the weight of earth, as to confine their fluid, and cannot cast them much slighter; and, perhaps, the Commissioners of Sewers may not think it very convenient to cleanse a sewer through an opening, filled with mains and service pipes: and, in the ear of the Sub-way Company, I may be allowed to whisper a suspicion, that the very tempting metal, of which some service pipes are made, may not be very safe, if all kinds of workmen are to have the run of their burrows.

It would be exceedingly convenient to have "firm and beautiful" streets "like terraces," fit for the promenade of men and beasts; and I should rejoice in the contemplation of such a luxury, but, most unfortunately for this reverie of bliss, I cannot avoid remembering, that

there is such a thing as vibration—that bricks and mortar have a strange tendency towards ruin, when acted upon by the gentle hoofs of ambling cart horses, and the stately bulk of a savoury waggon of soap lees ; and I sadly fear, that, some day, when gas, water, sewers, pavements, and sub-ways, are amicably enjoying their evening's meditations, rapt in visions of more than poetic harmony, some unlucky stack of chimnies, or ricketty house, may level all their speculations in an instant.

In contemplating the sub-way scheme, a horde of house-breakers may rub their hands with glee, elated at the prospect of such a royal road to plunder, uninfested by watchmen or patrol ; but however satisfied the projector may be, of the perfect practicability of the plan, I am equally well satisfied that, if any man of business sits down coolly to consider its expences, its inconveniences, and, possibly, its utter impracticability, he will come to the same conclusion as myself—that, however desirable it may be, and however easy of execution, when a new street is building, it would be little short of madness, to tear a whole city to pieces in pursuit of an object which, if not entirely visionary, certainly could not realize one-half of its alluring promises.

HARKYE!

November 1st, 1822.

The prospectus our unknown correspondent has here alluded to invites the public to create establishments, under the authority of parliament, to commence and complete these works. "In all cities and large towns, the frequent opening of the streets and roads for the Water and Gas Companies, as well as for the sewers and drains, has, for many years, become a lamentable and dangerous nuisance; and as this patent promises much towards abating, if not preventing it altogether, it is desirable to obtain the benefit for the public

with the least possible delay. As it must necessarily be undertaken upon a large and extensive scale, to be generally useful; and, by the authority of parliament, it is proposed to raise £100,000, in transferrable shares of £100 each, for the CITY OF LONDON PATENT SUB-WAY COMPANY."

The Patentee, perhaps, is not aware that the words of *every patent* runs thus—"Provided, likewise, nevertheless, and these our letters patent are upon this express condition, that if any person or persons, which shall or may, at any time or times, during the continuance of this grant, have or claim any right, title, or interest, in law or equity, of, in, or to, the power, privilege, or authority, of the sole use and benefit of the said invention hereby granted, shall make any transfer or assignment, or any pretended transfer or assignment, of the said liberty and privilege, or any share or shares of the benefits or profits thereof, or shall declare any trust thereof to or for ANY NUMBER OF PERSONS EXCEEDING THE NUMBER OF FIVE, or shall open or cause to be opened any book or books for public subscriptions, to be made by any number of persons exceeding the number of five, in order to the raising any sum or sums of money, under pretence of carrying on the said liberty or privilege hereby granted, or shall by him or themselves, or his or their agents, or servants, receive any sum of money whatsoever, of any number of persons exceeding in the whole the number of five, for such or the like intents or purposes, or shall presume to act as a corporate body, or shall divide the benefits of these letters patent, or the liberty and privileges hereby by us granted, into any number of shares exceeding the number of five, &c. &c., that then, and in any of the said cases, these our letters patent, and all liberties and advantages what-

soever, hereby granted, shall utterly determine and become void, &c. &c."

To the Editor of the Journal of Arts, &c.

SIR,

SEEING that you have described my improved vapour-bath in the last number of your interesting work, I should feel farther obliged if you could find a corner for the following practical observations.

The boiler, *a*, Fig. 1, (Plate XIV. Vol. IV.) should receive about three quarts of water, which is sufficient for the production of steam, at the requisite temperature, for one hour's use.

When the whole body is to be bathed, the patient sits upon the stool, under the calico covering, attached to the frame, *e*, Fig. 1, and which is also arranged for the application of steam to any limb or part of the body.

There are two perforated brass weights placed on the top of the valve of the boiler, Fig. 2, which being thus loaded, the steam can be raised to a high temperature, before it is determined through the conducting tube, *b, b*, Fig. 1. This will be found necessary when the whole body is to be immersed.

If the action of the vapour is to be limited to a limb or part of the body only, as the lower extremities, then one weight will be sufficient.

The regulation of the quantity, and the direction of the course of the vapour is easily adjusted by the patient, by turning the handle of the receiver, *d*, Fig. 1 and 3; so that a greater or less quantity of vapour may be determined through the small pipe, *h*, and the valve of the receiver, *c*, to the patient's body, according to his sensations.

Any volatile substance may be introduced into the receiver, as camphor, &c. for the purpose of medicating the vapour which is found highly beneficial in many cutaneous affections and rheumatic complaints.

The apparatus, when used near the bedside, is not attended with any inconvenience as to the production of dampness, all the condensed vapour being completely absorbed by the calico covering or hood.

In some instances, after the use of a vapour bath, it is found desirable, for the patient to retire, as soon as possible, to bed; and if, in these cases, the bath should be out of his own dwelling, the removal is often productive of more inconvenience and constitutional disturbance than can be compensated by any advantages derived from the use of the bath.

This apparatus is therefore rendered extremely portable, by packing up in a small compass, and is, in a few minutes, ready for use, without requiring the patient to quit his bed-room.

In all cases, where persons have been fatigued by travelling, or indisposed from exposure to cold, and damp air, recourse to a vapour bath constitutes, in the opinion of all medical men, the best preventive from cold which can be adopted; but the difficulty of procuring a warm bath in most situations, and the inconvenience of using it is so great, that patients, in general, are precluded from the advantage which may be derived from them. These objections are, however, obviated by the simplicity of construction and portability of the vapour bath now introduced.

Dr. Wilkinson, a gentleman of this city, well-known to the scientific world, has examined the principles and construction of this improved vapour bath, and considers it admirably calculated for all its purposes; and presumes

that it will be deemed a valuable acquisition in all hospitals, infirmaries, and public establishments, as well as private families, where vapour or warm bathing may be deemed requisite.

I am, Sir, yours, &c.

T. GAUNTLETT.

Bath; December 14, 1822.

Nobel Inventions.

Steam Engines.

MR. PERKINS has just obtained a patent for an improvement in the construction of steam engines; having, as he conceives, discovered some philosophical properties in steam, and in the laws of its mechanical action, hitherto unknown. By these improvements, a very important saving in the consumption of fuel is effected, and it is expected that the means may now be afforded of employing steam power to the purposes of navigation in general. It is supposed, that the weight of the engine, compared to those on the ordinary construction of equal power, will be reduced at least three parts out of four; its mechanism is extremely simple, and its construction embraces that desideratum—*perfect safety*.

We have seen one of the improved engines in progress, which is making to demonstrate the newly-discovered principle; its working piston is not more than two inches diameter, with a stroke of only twelve inches in length, though the power contemplated will be equal to ten horses, and the whole apparatus (except the fly-wheel) will not occupy a larger area than six feet by eight. The form and construction of the boiler possesses considerable novelty; and the quantity of water to be employed will not exceed

thirty gallons, which will not require to be replenished during a long voyage.

We believe that the plan has the decided approval of several practical engineers of the first talent; and if Mr. Perkins has not deceived himself by any false data, (which has sometimes disappointed the hopes of the most careful experimentalist,) this will be one of the most important discoveries made since the first invention of the steam engine.

Valve for Water Tanks and Cisterns.

Mr. Tyer, of Orange-street, Red Lion square, has constructed a very simple and cheap self-acting water valve, which may be constructed principally of wood. Plate 1, fig. 6, shews the apparatus, *a*, is a wooden box four or five inches long, three inches high and two inches wide; into the end of this box the leaden service pipe *b* is introduced, and secured by a quantity of cement made of bees-wax and rosin. A hole is perforated in the bottom of the box of equal diameter to the bore of the pipe, which hole is covered by a valve, *c*, formed by a piece of leather fastened at the side by two tacks so as to produce a hinge, and loaded on the top with about two ounces of lead. At the end of the box a lever *d* swings on pivots, with a piece of wood or cork, *e*, at its extremity; and near the fulcrum of the lever, a piece of strong wire, *f*, is inserted, which is bent round, and passes through the hole in the box, to the under side of the valve, *c*. The water in the tank or cistern being below the range of the lever, the block of wood or cork, *e*, descends, when the bent wire, *f*, presses up the valve, *c*; by these means, the water which flows into the box, from the service pipe, is enabled to discharge itself through the hole at

bottom. But, when the water in the cistern has risen to the dotted line, the block *c* floats and rises the lever. The end of the bent wire being then withdrawn from the underside of the valve, the weight of the lead causes it to come down, and close the aperture, by which the further delivery of the water is shut off.

Iron Rail-ways.

A very ingenious iron rail-way is about to be constructed by Mr. Palmer, who lately obtained a patent for his contrivance. Instead of two bars laid upon the ground as heretofore, upon which the wheels of the waggon ran, one rail only is now to be employed, supported upon upright posts firmly set into the ground. The carriages are to be suspended as a pair of panniers, having their wheels, which run upon the rail, in the middle; and the height of the posts are to be adjusted so as to keep the rail level, though the ground over which it passes may be extremely uneven. The carriage is drawn or towed by a horse with a rope which extends some distance forward, and allows him to pass over every inequality of ground, without interrupting the progress of the carriage.

We have seen a portion of this improved rail road, with one of the carriages suspended, and are really at a loss how to express our admiration of the ingenuity and simplicity with which every part of the apparatus is constructed and arranged. We shall in our next describe the specification of this invention, and hope to be favoured with the practical remarks of the patentee.

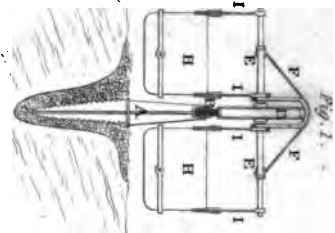


Fig. 1. A cross-sectional view of a mechanical device, possibly a pump or engine, showing internal components like pistons and valves. Labels include F, E, I, H, and A.

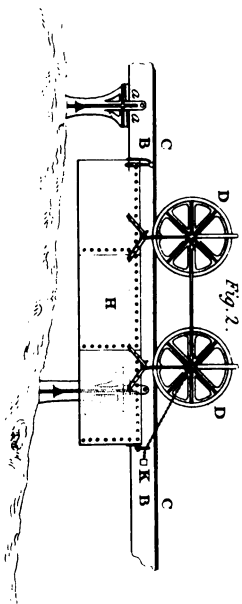


Fig. 2.

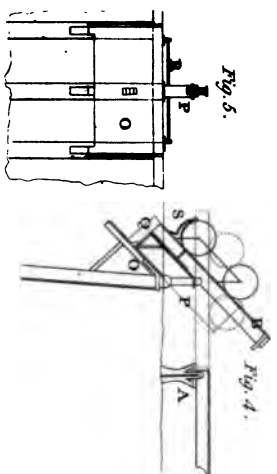
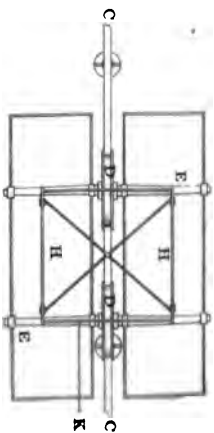


Fig. 5.

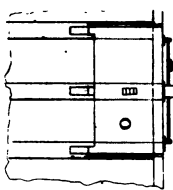


Fig. 7.

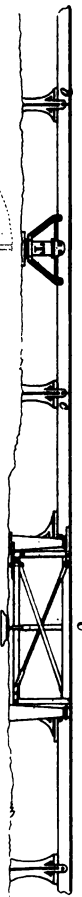


Fig. 6.



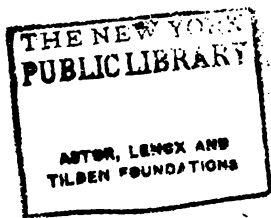
Fig. 9.



Fig. 8.



J. B. Brown & Co.



Polytechnic and Scientific Intelligence.

GREAT BRITAIN.

Royal Society.

THE *second* part of the transactions of this learned body has just appeared. It consists of papers of various interest: some of considerable importance. They are as follow:

Experiments and Observations on the Development of Magnetical Properties in Steel and Iron by percussion.
By W. SCORESBY, Jun., Esq.

This paper is confined to the application of the laws of practical magnetism; and particularly to the construction of magnets without the use of any magnetised substance.

The strong magnetising effect of percussion on soft steel induced Mr. SCORESBY to apply this property to the formation of magnets. For this purpose, he procured two bars of soft steel, thirty inches long, and an inch broad; also six other flat bars of soft steel, eight inches long, and half an inch broad; and a large bar of soft iron. The large steel and iron bars were not, however, absolutely necessary, as common pokers answer the purpose very well: but Mr. SCORESBY was desirous of accelerating the process by the use of substances capable of aiding the development of the magnetical properties of steel. The large iron bar was first hammered in a vertical position. It was then laid on the ground, with its acquired south pole towards the south; and upon this end of it the large steel bars were rested while they were hammered; and they were also hammered upon each other. On the summit of one of the large steel bars, each of the small bars, held also vertically, was ham-

mered in succession; and, in a few minutes, they had all acquired considerable lifting powers. Two of the smaller bars, connected by two short pieces of soft iron, in the form of a parallelogram, are now rubbed with the other four bars, in the manner of CANTON. These were then changed for two others; and these again for the last two. After treating each pair of bars in this way, for a number of times, and changing them whenever the manipulations had been continued for about a minute; the whole of the bars were at length found to be magnetised to saturation; each pair readily lifting above eight ounces.

In accomplishing this object, Mr. SCORESBY took particular care that no magnetic substance was used in the process. All the bars were freed from magnetism before the experiment, so that none of them, not even the largest, produced a deviation of five degrees on the compass at three inches distance. The hammers were also carefully examined. Any bars which had been strongly magnetized, and had had their magnetisms destroyed or neutralised, (either by hammering, heating, or by the simultaneous contact of the two poles of another magnet placed transversely,) Mr. SCORESBY always found had a much greater facility for receiving polarity in the same direction as before, than the contrary. Hence, it generally happened, that one blow with the original north end downward, produced as much effect as two or three blows did with the original south end downward. He also observed, that the polarity of pokers, generally supposed to be permanent and considerable in intensity, was rather transient and weak: for, in no instance, did he meet with a poker, the magnetism of which he could not destroy by a blow or two with a hammer, on the point; and, in general,

two blows, even when the poker was held in the hand, and not rested on any thing, were sufficient to invert the poles.

Three hammers were employed by Mr. SCORESBY in these experiments, of which the above are only a few of the many detailed in the original paper. One of the hammers weighed 22 ounces; another 12 ounces; and the other 2½ ounces.

On the alloys of Steel; by J. STODART, Esq. and Mr. M. FARADAY. For an account of this paper see our IIIId volume.

Some Observations on the buffy Coat of the Blood, &c.; by JOHN DAVY, M.D.

On the Mechanism of the Spine; by HENRY EARLE, Esq.

Of the Nerves which associate the Muscles of the Chest in the action of breathing, speaking, and expression, being a continuation of the paper on the Structure and Functions of the Nerves; by CHARLES BELL, Esq.

[See our second volume, page 468.] This paper is highly deserving the attention of the anatomist.

Experiments and Observations on the Newry Pitch Stone, and its products, and on the formation of Pumice; by the Right Hon. G. KNOX.

The formation of pumice in these experiments is one of the most singular results of the analysis of pitch stone and may prove useful in the arts.

Observations on the changes the Egg undergoes during Incubation in the common Fowl, illustrated by microscopical drawings; by Sir E. HOME, Bart.

The plates explanatory of this paper are ten in number, and possess very considerable merit.

Some Observations on Corrosive Sublimate. By JOHN DAVY, M.D.

[See an account of this paper in our IVth volume.

On the state of Water and æriform Matter in Cavities found in certain Crystals ; by SIR HUMPH. DAVY, Bart.

Some Experiments on the changes which take place in the fixed principles of the Egg during Incubation ; by W. BRONT, M.D.

Some Experiments and Researches on the Saline Contents of Sea Water, undertaken with a view to correct and improve its chemical Analysis ; by ALEX. MARCET, M.D.

From these experiments, Dr. MARCET infers .

That there is no mercury or mercurial salt in the waters of the ocean, as has been maintained by some of the French chemists.

That sea-water contains no nitrate.

That it contains sal-ammoniac.

That it holds carbonate of lime in solution.

That it contains no muriate of lime.

That it contains a triple sulphate of magnesia and potash.

On the ultimate Analysis of vegetable and animal Substances ; by ANDREW URE, M.D.

The improvements lately introduced into the analysis of vegetable and animal compounds, with the investigation of the equivalent ratios, in which their constituent elements, carbon, hydrogen, oxygen, and azote, are associated, have thrown an unexpected light into this, formerly, obscure province of chemical science.

The objects of the present paper are first to indicate and endeavour to remove several sources of fallacy attending the method of analysis with peroxide of copper; and next, to exhibit the results of its application to a considerable series of vegetable and animal compounds.

We cannot follow Dr. Ure through this elaborate and highly interesting paper; but we present our readers with a table of the results from his experiments.

TABLE OF ORGANIC ANALYSES.						
	SUBSTANCES.	Car- bon.	Hydro- gen.	Oxy- gen.	Azote.	Water. Excess
1	Sugar	43.38	6.29	50.33		56.62 Oxyg.
2	Sugar of diabetes	39.52	6.57	54.91		51.13 10.35
3	Starch	38.55	6.13	55.32		56.16 6.3
4	Gum arabic	35.13	6.08	55.79	3?	54.72 7.15 Hydro
5	Resin	73.60	12.90	13.60		15.20 11.20
6	Copal	79.87	9.00	11.10		12.5 7.6
7	Shell lac	64.67	8.22	27.11		30.51 4.62
8	Resin of guaiac	67.88	7.05	25.07		28. 3.93
9	Amber	70.68	11.62	17.77		20.0 9.46
10	Yellow wax	80.69	11.37	7.94		8.93 10.39
11	Caoutchouc	90.00	9.11	0.88		.99 9.00
12	Splent coal	70.90	4.30	24.80		27.90 1.20
13	Canal coal	72.22	3.93	21.05	2.8	23.68 1.30
14	Indigo	71.37	4.38	14.25	10	16.0 2.52
15	Camphor	77.38	11.14	11.48		12.91 9.71
16	Naphthaline	91.6	7.7	0.70?		0.79?
17	Spermaceti oil	78.91	10.97	10.12		11.34 9.71
18	Common oil of turpentine ..	82.51	9.62	7.87		8.85 8.64
19	Purified oil of turpentine ..	84.9	11.5	3.6		4.0 11.1
20	Naphtha	83.04	12.61	4.65		5.23 11.73
21	Asiatic castor oil	74.00	10.29	15.71		17.67 8.33
22	Alcohol, sp. gr. 0.812	47.85	12.24	39.91		14.9 7.25
23	Ether, specific gravity 0.70	59.60	13.3	27.1		30.5 9.9 Oxyg.
24	Bleached silk	50.69	3.94	34.04	11.33	35.43 2.55
25	Cotton	42.11	5.06	52.83		45.56 12.33
26	Flax by Lec's process	42.81	5.5	51.7		49.5 7.7
27	Common flax	40.74	5.57	52.79	0.9	50.16 8.2
28	Wool	53.7	2.80	31.2	12.3	25.7 8.3 Hydro
29	Cochineal	50.75	5.81	36.53	6.91	39.6 14.1
30	Cantharides	48.64	5.99	36.29	9.08	40.83 14.53
31	Urea	18.57	5.93	43.68	31.82	49.14 0.47
32	Benzoic Acid	66.74	4.94	28.32		31.86 1.4 Oxyg.
33	Citric acid	33.00	4.65	62.37		41.67 25.33
34	Tartaric acid	31.42	2.76	65.82		24.64 43.74
35	Oxalic acid	19.13	4.76	76.20		42.87 38.09
36	Ferropnassic acid	36.82	27.89	of iron	35.29	

The sugar which Dr. Ure employed in the preceding analysis, had been purified by Mr. Havard's steam process, and was so well stove-dried, that it lost no appreciable portion of its weight when enclosed along with sulphuric acid in *vacuo*. The diabetic sugar has a manifest excess of oxygen, which Dr. Ure believes to be the case with all weak sugars as they are called by the sugar refiners. The Dr. considers this excess of oxygen as the chief cause which counteracts crystallization, and therefore the great obstacle to the manufacture. The smallest portion of carbon which Dr. Ure ever found in any cane sugar was upwards of 41 per cwt. The experiments on starch and gum were among the earliest which he made, and the results differ so much from those given by other experimenters, that he promises to repeat the analyses at the earliest opportunity. The constituents of the above three bodies referred to the prime equivalent scale will be approximately as follows:

SUGAR.				STARCH.				GUM.			
Carbon	5 atoms	3.75	45.45	5 atoms	3.75	40.54	4 atoms	3.0	35.25		
Oxygen	4.....	4.90	48.55		5.00	54.05		5.0	58.90		
Hydrogen	4.....	0.50	6.14		0.50	5.54		0.5	5.85		
		8.25	100.0			9.25	100.0			8.5	100.00

Dr. Ure conceives the purest and strongest sugar to be constituted as here represented.

On the Placenta; by Sir E. HOME, Bart.

Of the geographical situation of the three Presidencies, Calcutta, Madras, and Bombay, in the East Indies; by J. GOLDINGHAM, Esq.

Of the difference of Longitude found by the Chronometer, and by correspondent Eclipses of the Satellites of Jupiter;

with some supplementary information relative to Madras, Bombay, and Canton; as also the latitude and longitude of Point de Galle and the Friar's Hood; by J. GOLDINGHAM, Esq.

Observations on the Genus Planaria. By J. R. JOHNSON, M.D.

November 30th, being St. Andrew's day, the Royal Society held its annual meeting at Somerset-place, when the president, Sir Humphrey Davy, presented the Copleian gold medal to the Rev. W. Buckland, professor of mineralogy in the University of Oxford, for his dissertation on some fossil remains lately discovered in a cave at Kirkdale, Yorkshire, printed in the last volume of the Philosophical Transactions.

The Society afterwards elected the following gentlemen as a council and officers for the ensuing year:—

Of the old Council.—W. T. Brand, Esq.; Samuel Goodenough, Lord Bishop of Carlisle; T. Combe, Esq.; Davies Gilbert, Esq.; C. Hatchett, Esq.; I. F. W. Herchell, Esq.; Sir Everard Home, Bart.; J. Pond, Esq., Astronomer Royal; Dr. W. Hyde Wollaston; and Dr. T. Young.

Of the new Council.—C. Babbage, Esq.; Sir Gilbert Blane, Bart.; Charles Lord Colchester; J. W. Croker, Esq.; John Earl of Darnley; Sir Henry Halford, Bart.; Dr. C. Hutton; Captain Henry Kater; W. Hasledine Pepys, Esq.; and J. Sabine, Esq.

OFFICERS:

President.—Sir Humphrey Davy, Bart.

Treasurer.—Davies Gilbert, Esq,

Secretaries.—W. T. Brand, and T. Combe, Esqrs.

Society of Arts.

The meetings of this society since our last notice

have possessed but little interest, and, with the exception of expelling one of their members, alluded to in our former report, nothing of public importance has transpired.

The Committees of Correspondence and Papers have been busily employed in the completion of the fortieth volume of their transactions, which is expected to appear soon after the Christmas recess. The Committee of Polite Arts, Accounts, and Miscellaneous Matters, have been wholly occupied upon the private business of the society. The Committees of Mechanics have been unusually dull; the subjects upon which they have deliberated being for the greater part of a trifling nature. A cinder-sifter, which consisted merely of a box covered by a grating introduced in the hearth or in the fender. A door lock with a guard to prevent the intrusion of false keys and pick-locks: within the handle of the key, at the end of the pipe, a small projection is formed, which, when the key is introduced into the lock, presses against a pin and liberates the tumblers, which allows the bolt to be withdrawn. A truss for hernia, consisting merely of an elastic pad attached to a girdle. Several surgical instruments for different operations; and various other inventions which stand over for future consideration.

Royal Academy.

Monday evening, December 9th, Sir A. Carlisle delivered his fifth Lecture on Anatomy, as connected with the Fine Arts. He described the construction, and explained the action of the muscles, which were of two kinds, the *volatile*, or those subject to the mind; and *automatic*, or those over which the will has no power, as the heart, &c. The powers of the muscles are too great

to admit of comparison with any known mechanical power; their names are generally derived from their figures, functions, or local positions. An intimate knowledge of anatomy was necessary to correct and chasten the conception of the sculptor or painter, for it was the close study of the human figure, which gave the ancients their decided superiority in execution.

Tuesday, December 10th, being the fifty-fourth anniversary of this Institution, the president and members assembled for the purpose of delivering the prize medals to the successful candidate.

Among others, Sir T. Laurence presented

The silver medal for the best Architectural Drawing to Mr. C. Purser. And

The silver medal, for the best die of the head of Apollo, to Mr. B. Wyon.

New Method of conducting the Electric Fluid from Ships.

MR. W. S. HARRIS has lately exemplified, on the *Louisa* and *Caledonia* men-of-war, at Plymouth, the vast utility of his invention for conveying the electric fluid by means of a copper conductor fixed in the masts through the bottom of the ships. Mr. Harris proposes to place in the back of the masts a slip of copper, which is to be continued to the interior or hole of the cap of each mast; consequently, coming into contact with the mast above, the continuity will be preserved, without preventing the upper masts being lowered. The conductors of the lower masts are to be continued to the keel, and made to communicate with one or more copper bolts in contact with the exterior copper or the water. It must be clear, therefore, that this arrangement pre-

serves a permanent conductor so long as any part of the mast is continued; and, as the masts of the ship may be considered as mere points, when contrasted with a thunder cloud, thus armed, they are virtually pointed conductors. The experiment was made in the presence of the Navy Board, several nautical gentlemen, and the officers of the dock-yard; and, although carried on under the disadvantages of unfavourable weather, convinced all present of its efficacy. We understand that the *Minden*, a seventy-four, and the *Java* frigate, are to be thus equipped preparatory to the general introduction of Mr. Harris's invention into the navy.

Analysis of Tutenag.

It appears, from an analysis made by Dr. FYFE, of part of a basin of white copper, which Dr. Hewison obtained when in China, that its component parts are copper, zinc, nickel, and iron: the last in small quantity. The basin in possession of Dr. Hewison is of a whitish colour, approaching to that of silver, and is very sonorous. When held in one hand, and struck with the other, the sound is distinctly heard at the distance of an English mile. It is also highly polished, and does not seem to be easily tarnished. The piece that was sent to Dr. Fyfe was malleable at a natural temperature, and at a red heat; but, when heated to whiteness, it was quite brittle, breaking with the slightest blow of a hammer. By great caution, it was rolled into thin plates, and was drawn into wire, of about the thickness of a fine needle. When forced into contact with the atmospheric air, it oxidated, and burned with a whitish flame, in the same way as zinc does. Its specific gravity at 53° degrees was 8.432. An analysis of five grains produced the following results:—

Copper	-----	2.02, or in the 100 parts	40.4
Zinc	-----	1.27	25.4
Nickel	-----	1.58	31.6
Iron	-----	0.13	2.6
		5.60	100.0

The method which is practised in preparing white copper is not known in this country; but it is suspected that it is obtained by the reduction of an ore containing the ingredients of which it is composed: several specimens of this ore have, it is said, been seen in China. The basin in the possession of Dr. Hewison cost in China about one-fourth of its weight in silver. The exportation of this alloy is prohibited.—*Edinb. Phil. Journal.*

Ancient Aerolite!

A Danish journal mentions the circumstance of an anchor, which had fallen from the air, being deposited in the church of Kloena, in Iceland. The information is contained in a book called the *Speculum Regale*, supposed to have been written by the Danish King Snorro, in the thirteenth century. The Danish journal supposes, what is very probable, that it was an aerolite in shape resembling an anchor, or that an anchor had been made of this meteoric iron in the early ages of Danish navigation.

Azotic Springs in North America.

In the town of Hosick, Renssalaer county, New York, are three Springs within four or five acres of ground, from which issues an incalculable quantity of pure nitrogen gas, of which a quart may be collected in an inverted bottle or jar, in ten seconds, by pressing on

a surface, five or six inches square, of the gravel beneath the water.

A new Mineral, called Gibbsite,

After a celebrated American mineralogist,—has been discovered by Dr. Emmons in a mine of brown hæmalite in Richmond, Massachusetts. It is rather harder than calcareous spar, is slightly translucent, and has a specific gravity of 2,40. It whitens before the blow-pipe, and does not effervesce with acids. Its constituents are,

Alumina . . .	64,8
Water . . .	34,7
Loss . . .	,5
	100

Antiquities.

G. Gibson, Esq. has recently presented to the Society of Antiquaries, at Newcastle, a fine collection of Roman antiquities, which were found last June at Houseteada, the celebrated Roman station of Borcovicus, of which that gentleman is proprietor. They were dug up from what is supposed to have been a temple of Mithras, the Persian deity, whom the Romans adopted into the number of their gods in the second century, and consist of some sculptured altars, one very valuable, as the date of its erection is inscribed upon it; and some very curious bas-reliefs, illustrative of the Mithraic rites. At the last monthly meeting of the society, a paper was read by the Rev. J. Hodgson, secretary, upon these rare and precious remains of Roman times, of which nothing of the kind had previously been discovered in Britain.

Gas from Pyroligneous Acid.

It has lately been discovered, that when wood acid is made to pass through an iron tube, heated to bright ignition, and the acid allowed to enter the tube by drops, in quick succession, gas of a very excellent quality is obtained. This singular fact was first observed by Mr. Leet, of Chester, whilst pursuing some experiments on the purification of pyroligneous acid, and is a discovery admitting of considerable practical application.

Optical Invention of the North American Savages.

A recent traveller, speaking of the Esquimaux Indians, says, "Their snow eyes, as they very properly call them, are a proof of their sagacity. They are little pieces of wood or ivory, formed to cover the organs of vision, and tied on behind the head. They have two slits of the exact length of the eyes, but very narrow, and they see through them very distinctly, and without the least inconvenience. This invention preserves them from snow blindness, a very dangerous and powerful malady, caused by the action of the light strongly reflected from the snow, especially in the spring, when the sun is considerably elevated above the horizon. The use of these eyes greatly strengthens the sight; and the Esquimaux are so accustomed to them, that when they have a mind to view distant objects, they use them instead of spy-glasses."

New Patents sealed in 1822.

To William Piper, of Cookley Iron-works, in the parish of Wolverley, and county of Worcester, civil engineer; for his invention of several new anchors, for the use of shipping and other vessels.—Sealed November 1st.—2 months for enrolment.

To Alfred Flint, of Uley, in the county of Gloucester, engineer; for a machine, for scouring and washing of woollen cloths.—Sealed November 1st.—2 months for enrolment.

To John Oxford, of Little Britain, in the city of London, gentleman; for his improved method of preventing premature decay in timber, metallic substances, and canvass; by the application whereof to such several bodies respectively, the same are respectively rendered impervious to the dry-rot, damp-rot, worms, insects, or rust, to which the same are respectively liable; and the same are hereby rendered more durable and less liable to decay.—Sealed November 1st.—2 months for enrolment.

To John Dowell Moxon, of Liverpool, in the county of Lancaster, ship owner and merchant; for his improvements in the construction of bridges, and works of a similar nature.—Sealed November 9th.—6 months for enrolment.

To Richard Roberts, of Manchester, in the county of Lancaster; civil engineer; for certain machinery or implements, applicable to the process of weaving plain or figured cloths or fabrics, which may be used on and in conjunction with looms now in common use; and also certain improvements in the construction of looms, for weaving plain and figured cloths or fabrics, and in the method of working looms, either by hand, by steam, or by other power.—Sealed November 14th.—2 months for enrolment.

To Jacob Perkins, late of Philadelphia, in the United States of America, but now of Fleet-street, in the city of London, engineer; for communications made to him by certain foreigners residing abroad, and discoveries by himself of an invention of certain improvements in steam engines.—Sealed December 10th.—6 months for enrolment.

To William Robson, of Saint Dunstan's Hill, Tower-street, in the city of London, printer and stationer, for his method to prevent or protect against fraudulent practices, upon banker's checks, bills of exchange, and various species of mercantile, commercial, and other correspondence.—Sealed December 10th.—6 months for enrolment.

To John Nicholson, of Brook-street, Lambeth, in the county of Surrey, civil engineer, for certain apparatus for the more conveniently applying heat to certain instruments of domestic use.—Sealed December 16th.—6 months for enrolment.

To Thomas Barnard Williamson Dudley, of King-street, in the parish of St. Anne, Westminster, in the county of Middlesex, mechanist, for "a method of making or manufacturing malleable cast metal shoes for draft and riding horses, and other animals, upon a new and improved plan or principle."—Sealed December 16th.—6 months for enrolment.

To William Bundy, of Fulham, in the county of Middlesex, mathematical instrument maker, for a machine for breaking, cleaning, and preparing flax, hemp, and other vegetable substances, containing fibre.—Sealed December 16th.—6 months for enrolment.

To John Dumbell, of Howley House, Warrington, in the county palatine of Lancaster, merchant, for certain improvements relative to carriages, which may be applied thereto, or in improving of the organization, driving, actuating, accelerating, or moving of vehicles, and carriages in general.—Sealed December 16.—6 months for enrolment.

To John Bainbridge, of Bread-street, Cheapside, in the city of London, merchant, for a communication made

to him by Amos Thayer, junior, of the city of Albany, in the United States of America, mechanist, of certain improvements on rotatory steam engines.—Sealed December 16.—6 months for enrolment.

To William Pass, of Curtain-road, in the parish of Saint Leonard, Shoredich, in the county of Middlesex, dyer, for an improvement in calcining and smelting of various description of ores.—Sealed December 20th.—6 months inroled.

To Sir James Jelf, of Oaklands, near Newnham, in the county of Gloucester, Knight, for a combination of machinery for working and ornamenting marble, for jams, mantles, for chimney-pieces, and other purposes.—Sealed December 20th.—6 months for enrolment.

To John Isaac Hawkins, of Pentonville, civil engineer, and Sampson Mordan, of Union-street, City Road, portable pen maker, for improvements on pencil holders or port-crayons, and on pens for the purpose of facilitating writing and drawing by rendering the frequent cutting or mending of the points or nibs unnecessary.—Sealed December 20.—6 months for enrolment.

To Thomas Rogers, of Store-street, Bedford-square, in the county of Middlesex, Esq. for a method or apparatus for the purpose of attaching trowsers and gaiters to boots and shoes.—Sealed December 26.—6 months for enrolment.

To George Richards, of Truro, in the county of Cornwall, architect, for certain improvements in grates, stoves, and other inventions for the consumption of fuel, and in the flues connected with them, whereby they are rendered more safe, and the smoke prevented from returning into the rooms in which they are placed; and also for an improved apparatus for cleaning the same.—Sealed December 26.—6 months for enrolment.

CELESTIAL PHENOMENA, JANUARY, 1823.

D. H. M. S.		D. H. M. S.	
1 0 0 0	☉ in Perigee.	1° 12'. ☽ 18° 6' S. ♂	
2 13 4 0	☉ in superior conj. with ♃ long. 9° 11' 30'.	19° 18' S.	
3 16 15 0	☾ in quadrature entering the last quarter.	☽ First Quarter.	
4 0 0 0	♂ station, long. 1° 3' 16'.	☽ in conj. with ♄, long. 1° 3' 29'. Diff. of dec. 7° 9'.	
8 0 0 0	♂ in conj. with ♀, long. 9° 20' 10'. Diff. of dec. 1° 9'. ♄ 23° 51' S. ♀ 22° 41' S.	♄ 17° 34' N. ♄ 10° 25' N.	
8 3 45 0	☾ in conj. with ♄ long. 8° 7' 30'. Diff. of dec. 1'. ☾ 26° 1' S. ♄ 26° 2' S.	☽ enters ☊.	
9 0 0 0	☾ in Apogee.	21 0 0 0	♂ station, long. 1° 26' 31'.
11 0 0 0	☉ eclipsed, invisible at Greenwich, long. 9° 21' 26', lat. ☾ 1° 24' S.	21 12 42 0	☽ in conj. with ♄, long. 1° 26' 20'. Diff. of dec. 5° 38' ☽ 24° 17' N. ♄ 18° 39' N.
11 21 8 0	Ecliptic conjunction, or ☉ New moon.	30 0 0 0	♂ in conj. with ♂, long. 10° 14' 30'. Diff. of Dec. 57'. ♄ 18° 5' S. ♂ 17° 18' S.
12 7 29 0	☽ in conj. with ♀, long. 9° 26' 29'. Diff. of dec. 9' ☽ 21° 47' S. ♀ 21° 56' S.	23 19 57 0	☉ in quadrature to ♄.
12 10 42 0	☽ in conj. with ♄, long. 9° 28' 15'. Diff. of dec. 1° 10'. ☽ 21° 13' S. ♄ 22° 23' S.	24 0 0 0	☉ in Perigee.
13 6 58 0	☽ in conj. with ♂, long. 10° 8' 13'. Diff. of dec.	26 0 0 0	☉ eclipsed, partly visible.
		3 37 51	Beginning.
		4 34 21	☽ rises, eclipsed.
		4 35 21	Beginning of total darkness.
		5 23 36	Ecliptic opposition. ☉ Full moon.
		5 24 22	Middle.
		6 13 22	End of total darkness.
		7 10 53	End of eclipse.

N.B. All the above calculations are made to Mean or Clock Time.
The waxing Moon, ☽—the waning Moon, ☾.

METEOROLOGICAL JOURNAL, 1822.

DATE.	Thermo.		Barometer.		Rain in Inches.	DATE.	Thermo.		Barometer.		Rain in Inches.
	Higt.	Low.	+	-			Higt.	Low.	+	-	
Nov.						Dec.					
26	55°	44°	+03	....	,075	11	34°	22°	+04	....	....
27	50	39	+14	....	,05	12	40	25	....	-,01	....
28	44	34	....	-,22	...	13	40	29	+02	-,06	....
29	43	32	....	-,17	,375	14	36	30	....	-,05	....
30	45	29	+12	-,01	,075	15	36	23	....	-,05	....
Dec.						16	33	29	+13	....	....
1	48	34	....	-,39	,125	17	35	29	....	-,03	....
2	42	33	+03	....	,325	18	44	33	Stationary	....	....
3	40	30	+29	....	,4	19	38	32	+10	....	....
4	44	28	....	-,17	....	20	30	26	Stationary	....	....
5	43	30	+29	-,50	,175	21	33	28	....	-,02	....
6	43	38	+30	....	,525	22	39	24	....	-,03	....
7	41	30	+13	....	....	23	40	33	Stationary	....	....
8	43	27	....	-,02	....	24	36	32	+13	....	....
9	49	36	+02	-,01	....	25	36	29	+14	....	....
10	40	32	+21	....	,15	26	37	25	+02	-,05	....

Lower Edmonton.

C. H. ADAMS.

LITERARY NOTICES, &c.

Mr. J. P. Neale has commenced a work illustrative of all the varieties of Ecclesiastical Architecture.

The second edition of the third part of Green's Universal Herbal, arranged on the Linnean system, and adapted to scientific and the most useful practical purposes, elucidated by numerous plates, accurately coloured according to nature, will shortly be presented to the public.

J. Bayley, Esq. F. S. A. one of the sub-commissioners on the public records, is collecting materials for a complete History of London, Westminster, and Southwark, which is to be enriched with a great variety of engravings.

The art of Mezzotinto Engraving on Steel, which has lately been brought to perfection, possesses all the softness and richness of copper-plate, with the incalculable advantage of a single plate producing many thousands of excellent impressions. The merit of applying mezzotinto engraving to steel plates belongs to the present generation, (see Journal, page 255.) General steel engraving is being to be extensively practised.

A curious and extensive collection of Natural History has been opened at the Egyptian Hall, Piccadilly. A living guu, two fierce but handsome dogs from the Cape, and a huge hippopotamus stuffed, attract particular attention.

A roll of Papyrus, about eleven inches in length, and five in circumference, has been discovered in the

island of Elephantana, Egypt, containing a portion of the latter part of the Iliad, lexibly written in the large capitals that were in use in the time of the Ptolemies, and the earlier Roman emperors.

FRANCE.—M. ANDOUARD, physician in the hospitals at Paris, who went to Barcelona in 1821, has published an *Historical and Medical Narrative of the Yellow Fever that prevailed at that place.*

Count LASTEYRIE is publishing a grand work on the Anatomy of Man, in 240 folio lithographic engravings, and 120 sheets of letter-press.

The French papers of Dec. 18th announce the death of M. ANDRIEU, the celebrated medalist, whose fame is inseparably connected with the Napoleon series of medals, the first medallie work of modern times. M. Andrieu stood, by general consent, at the head of his art.

A Literary and Philosophical Society is about to be established at Sheffield.

The bas-relief of the Holy Family, by Michael Angelo, recently purchased at Florence by Sir George Beaumont, will be added to the fine collection of marbles in the British Museum.

On the 15th will appear, No. I. of a new literary work, to be entitled, *Res Literariae*, or Monthly Journal of Foreign and Domestic Literature.

NOTICES TO CORRESPONDENTS.

The subject of Mr. S——'s communication being before the Society of Arts, we are prevented from inserting it in our Journal, as, by an existing law, the Society claims the right of publishing for their own profit such inventions as they may think proper to reward.

The Communication of Mr. C—— is inadmissible, the subject having been already given in our second volume.

Mr. G——'s papers will be considered, and if possible inserted in our next.

THE
London
JOURNAL OF ARTS AND SCIENCES.

No. XXVI.

Recent Patents.

To HENRY ROBINSON PALMER, late of Hackney, Middlesex, but now of Abingdon Street, Westminster, Civil Engineer; for his Improvements in the Construction of Rail-ways, or Tram-roads, and of the Carriage or Carriages to be used thereon..

[Sealed November 22, 1821.]

THE first of these improvements consists in the substitution of a single rail, supported upon posts, set at certain distances apart, instead of the double rails usually laid upon the ground. These posts vary in length, according to the elevation or depression of the surface over which the rail-way is to be carried, and are inserted into the ground, so as to make their upper parts perfectly coincide in a horizontal line. On the tops of these posts the bar or rail is then placed, and properly secured; by which a smooth level surface of rail-way is produced,

and extended to any distance over a rugged or uneven country, without the expence of levelling the ground.

The second improvement is in the construction of a carriage applicable to this description of rail; which consists of two boxes to be suspended on the sides of the rail, and braced together by suitable bars or rods, with two central wheels, running upon the rail, and supporting the carriage by their axles.

Plate III. Fig. 1, is an end view of the carriage, with a cross section of the rail, and of the post, shewing its form and manner of fixing. Fig. 2, is a side view of the rail passing over an uneven surface, with three of the supporting posts of unequal lengths. Upon the upper surface of the rail, the two carriage-wheels are seen, and the manner of suspending the boxes from their axles is also shewn. Fig. 3, is a horizontal view of the same, by which the comparative thickness of the rail is seen, and the mode of bracing the boxes together. In these three figures, the same letters refer respectively to the same parts of the apparatus.

A, A, A, are the posts, a series of which are placed in the course or line of the intended road, at about nine feet apart; they are proposed to be made of cast iron, or any other suitable material, with ribs at right angles. A flanch or shoulder is formed at that part which rests upon the surface of the ground, and below it the ribs converge with notches on their edges, as shewn at Fig. 1. The manner of fixing them in the ground must vary according to circumstances, but the general method proposed, is by digging a hole of a conical form, about two-thirds the depth into which the stem of the post is intended to be sunk, the broadest part of the hole being about twice the diameter of the flanch or shoulder. By means of a machine, like a pile-driving engine, a weight of a conical

shape is employed to beat the hole sufficiently deep to receive the stem, leaving a space all round it; and also to compress the earth around. Flint stone, or other hard substances, broken small, are now to be introduced, and rammed down so as to form a compact bed. The post is then set in, and adjusted to its proper height by a level, and the hole filled up with the broken flints or other hard substances, the whole being firmly rammed together. By these means the supports of the rail are very solidly and securely fixed into the ground.

At the upper extremity of the post A, a long cleft or opening *a, a*, is formed to receive the rail B. Under the rail in this cleft two wedges are introduced, whereby its level may be adjusted with minute accuracy. The principal substance of the rail is proposed to be composed of timber, well seasoned, with bars or plates of iron, *C*, upon the upper surface. The timber part is intended to be formed by two planks, set side by side upon their edges, as seen at B. fig. 1.; these planks are about eleven inches deep, and an inch and a half thick, their lengths being sufficient to extend from the first to the third post, or from the second to the fourth, alternately, blocking each other's end joints. The rail is secured to the post by a strong screw bolt. The form of the top rail or iron bar may be varied at pleasure, but flat bars are recommended with the edges slightly rounded. They are affixed to the wooden rail by screws, the heads of which are counter-sunk, to render the surface perfectly smooth.

The peripheries of the wheels, *D, D*, which support the carriage, must be made to suit the form of the rail; if the rail is flat, the wheels must be cylindrical, with lips or edges; if round, the peripheries must be concave, &c. The arms or axles, *E, E*, on which the wheels revolve, extend on each side, and by means of rods *I, I*, and

braces, F, F, support the boxes of the carriage, as seen in the three first figures. H, H, are the boxes, or receptacles for containing the coal, ore, or other material to be conveyed. These are proposed to be formed of sheet iron rivetted together, but they may be of wood or other material. A chain or rope, K, is attached to the beam, or may be otherwise fastened to the carriage, for the purpose of drawing it forward upon the rail; and to this rope, of any length that may be found eligible, the horse is connected in the most convenient manner; by which the load is towed along in the same way that vessels are usually towed upon canals and small rivers.

The several parts of the rail and carriage being explained, the patentee states that he reserves to himself the liberty of "constructing a single elevated rail, to be used as herein described; and also of connecting and forming the parts of the carriage heretofore described; so as to establish the position of the receptacles, with or without their load, in regard to the rail, as before described, in any other form, and with any other materials, than those described; so that such rail-way and carriage, when constructed in any other form, or with any other materials, shall have the relative positions of their parts as hereinbefore mentioned."

The specification proceeds to describe some other contrivances, which, in the application of this plan, may be found convenient; but these contrivances are not claimed as forming any part of the patent right.

The manner of loading and unloading of the carriages, must of course depend on the material which is to be transferred.

In order that the loading may be performed without disturbing the position of the carriage, it is necessary to place a block or any other support under that side which

is loaded first; or, as in many cases, the loading would be performed at given places: the carriage to be filled may be brought over a stationary block; when one side is filled, the other may be supplied, and that being full, the first will rise off the block, and the carriage may be moved. As the careful balancing of the carriage is not at all necessary to its progress, no particular pains are required in the adjustment, as it will admit of a great difference of weight in the two sides, without in any degree interfering with the advance of the carriage. When it is required to load at various and uncertain parts of the line, a prop, forming two legs, may be connected with the side of one of the boxes, which may be turned down whenever it may be wanted, and returned when the loading has been completed.

The unloading is capable of being done in various ways; that shewn in the plate, figs. 4 and 5, supposes a substance which is to be shot at once into a barge, as coal. Fig 4, represents a side view or a section of a shoot on the side of a wharf. Fig. 5, a front view of the same. O, is the shoot or sloping trough which receives the material from the carriage, and is adapted to convey it into a barge, which may be brought under it. A, A, fig. 4, is part of the line of rail-way brought to the wharf; P, is the last pillar of the line; B, is a rail which turns vertically on a centre upon P; Q, is a foot or stop to limit the angle which the rail may assume, by its coming in contact with the shoot. When the rail is in a horizontal position, a carriage may be brought upon it, but there is a projection about the centre of the under side of each box, which coming in contact with the bar R, fig. 5, is prevented from proceeding too far. There is also a projecting arm on the end of the rail at S, fig. 4, which is curved to correspond with the circle of the wheel; so that when the

carriage is ready to be discharged, the face of the front wheel coincides with it, and cannot go beyond it. The centre of the carriage being then over the bar R, the rail may be elevated to any sufficient angle, and the suspending rods will remain perpendicular, as shewn in the plate. The ends of the boxes being made to open, by turning on a joint at the upper side as seen in fig. 2, and being secured only by the latch, as at H, in fig. 1, when the carriage is brought to the inclined position, one end of each latch has touched a projection on the shoot which turns them up; the weight of the material in the boxes then forces the ends open, and both are discharged at the same time; the attendant has therefore only one motion to perform in unloading, viz. changing the position of the rail, the unlatching and discharging being the consequences of the altered position.

When it is required to shoot the contents at various parts of a line, carriages are adapted accordingly. One method which has been put in execution is thus: the boxes are suspended by their extremities, and turn each upon its own centre, so that they may be discharged sideways.

To continue a conveyance partly by this kind of railway, and partly by common roads or other methods, it is obvious, that if a truck without the body or box be brought under one of the suspended carriages, the suspended box may instantly be released from its slings, and at once be lodged on the other wheels, the only necessary provision being that the change must take place when the rail is of sufficient height to admit of the truck being brought under the box. This offers great facility in the supply of coals, &c. for towns, as the conveyance can be continued without discharging if required.

It may be required to have a branch line of rail-way

leading from the general line, which may be effected by means of a swinging-rail, supported upon a vertical shaft T, fig. 6 and 7. This shaft is hollow, having a spindle within, which being fixed to the solid cap, enables the bar to turn round horizontally with the carriage upon it; and the ends of the bar fitting exactly to the ends or junctions of the rails *b*, *c*, and *d*, form, when turned in the desired direction, a continuation of the rail at any angle from the direct line. When a loaded carriage is brought on to the swinging-rail over the centre pillar T, the rail may be turned round with ease into the situation shewn by dots at T, *d*, fig. 6, and hence the carriage is drawn forward upon the new line or branch rail-way at right angles to the former without further impediment.

In order to cross a public road, the rail not being sufficiently high for carriages to pass under it, a gate is proposed similar to that shewn at U, fig. 7. This gate wings upon its hinges like a turnpike-gate, and is supported upon two upright cast iron posts; to one of which it is connected by its hinges, and into the other the rail falls and locks, so as to render the continuation of the rail-way firm and secure when closed. This gate, however, should in general remain open, that the public way may not be obstructed; and when the rail-way carriages are about to pass, it must be shut by the driver, and opened again as soon as the carriages have proceeded beyond it.

There is a provision for what is called a siding or passing place; this is shewn at fig. 8. When trains of carriages are proceeding in opposite direction upon this rail, it will be necessary for one train to draw off and pass upon the lateral rail by means of swinging-bars similar to the gate last described, examples of which are shewn in the plan, fig. 8, at *f*, *g*, *i*, and at *f*, *g*, *h*, by which means one train of carriages are enabled to proceed

upon the direct line, and another train to pass upon the lateral rail: the distance of these parallel rails from each other must be sufficient for the respective carriages to pass without obstruction. A similar mode may be employed for drawing the carriages on to a curved branch, as at fig. 9, the direct line being *k, l, m, n*, but the curve turning off by the swing-gate at *l, o, to p*.

It is recommended that the rail should be something narrower, and curved on its upper surface, at those parts of the way which bend or deviate from the direct line, in order to allow of the carriages proceeding without the edges of the wheels rubbing against the rail; and that the rails be cast to the form of the curve, and not made of straight pieces set at angles; also that the post at these parts should be placed closer together. The object of these improvements are, to lessen the first expence of laying railways; to reduce the friction on the surface, and render them capable of being traversed at all weathers.

"The principal advantages of this invention are, that a perfect plane can, by the adjustment, be obtained with facility; that, by its elevation above the common surface it is always free from dirt; and that the use of it is not interrupted by snow:—also the great expence, and frequent impediments occasioned by repairs in the ordinary mode, are for the most part here dispensed with, and the original cost is generally much less than other methods."

"As a great part of the resistance to the motion of carriages on a rail-way arises from the imperfection of the plane, the removal of such obstacles, as far as is done by this contrivance, presents a great reduction in the expence of conveyance. The amount of the whole resistance, by friction, that is of the plane and the axles together, the wheels being 22 inches diameter, is the $\frac{1}{365}$ th part of the whole weight of the carriage and material conveyed."

Enrolled. May, 1822.

*To JAMES FROST, of Finchley, Middlesex, Builder; for
a New Cement or Artificial Stone.*

[Sealed June 11, 1822.]

THE patentee states that in order to make this artificial stone, he "selects such limestone, or marle, or magnesian limestone, or marle, as are entirely or nearly free from any admixture of alumina, or argillaceous earth, and containing from nine to forty per cent. of siliceous earths, or combination of silica and oxide of iron, the silica being in excess, and in a finely divided state."

These selected materials are to be broken into small pieces, and calcined in a kiln, in the same manner that calcareous substances are usually treated, which operation is to be continued until all the carbonic acid is expelled. The calcined materials are to be ground to a fine powder, which is then in a fit state for making the cement or artificial stone. This powder must be kept perfectly dry, in suitable packages, until used.

The cement is made by mixing the powder, as prepared in a sufficient quantity of water, to bring the materials into the consistency of common mortar. Small portions only of this are to be mixed, and applied immediately to the purpose for which it may be intended, as it sets in a few minutes, and gradually becomes as hard as a stony substance. For many purposes a quantity of clean siliceous sand may be advantageously incorporated with it, when it is tempered for use.

The cement will be lighter or darker in colour, according to a less or greater quantity of oxide of iron, contained in the materials selected for its composition; the lighter coloured cement, will be found best adapted for dry, and the darker for wet situations.

The patentee states his invention "is for making a ce-

ment, or artificial stone, from siliceous limestone or marble in the manner hereinbefore described," and that he denominates it the BRITISH CEMENT.

Inrolled August, 1822.

To JAMES FROST, of Finchley, in the County of Middlesex, Builder; for an Invention of a New Method of Casting or Constructing Foundations of Piers, Walls, Ceilings, Arches, Columns, Pilasters, Mouldings, and other Ornaments to Buildings.

[Sealed September 27, 1822.]

WE presume that the present patent is to be considered as an improvement upon the foregoing one, granted to the same person, in June, for artificial stone. The specification does not, however, refer to any former invention, but merely states that the present invention "consists in casting or constructing foundations, piers, walls, ceilings, arches, columns, pilasters, mouldings, and other ornaments to buildings, so that the same may be finished at once and in their places as the work proceeds."

For this purpose moulds are to be constructed in wood, or metal, suited to the form of the intended erection or ornament. These moulds are to be fixed to the spot where the work is to be stationed, and all places carefully stopped with putty, through which the composition intended to be employed might ooze. As few moulds are to be employed as possible, and when one part of the work is formed, the moulds are to be shifted to another corresponding part progressively, until the whole is completed. In forming the surface of a circular ceiling or arch, the work is to be divided into parallel compartments, extending from abutment to abutment, and the moulds removed as the composition hardens from place to

place. In the construction of domes or spherical ceilings, the compartments are to be formed by iron ribs, and these moulds are proposed to be employed; when the work, supported by their surface, becomes set and solid, the middle mould is to be removed, and placed up in the adjoining compartment, in continuation of the design.

The inner surfaces of the moulds are to be covered with some substance which will prevent the adhesion of the composition, such as grease or oil, when plaster of Paris is employed; but when other quick setting cements are used, the interior of the moulds should be covered with fine linen, paper, or thin glue, laid on warm, but suffered to cool before the mould is used.

"The required works are to be formed by using hard and durable substances imbedded in such calcareous cement as will set quickly, and without shrinking, and will harden in a short period; such as Roman cement, Dobbs's patent cement, my British cement, Lorient's composition mortar, and calcined gypsum, or plaster of Paris. For aquatic situations, I select such as will readily set and harden under water; for all external works, such as will bear the vicissitudes of the weather; for ceilings and cornices, and other enrichments, which require a fine face, I mix as quickly as possible a small quantity of plaster of Paris with water, to a creamy consistency, and instantly apply a thin coat thereof with a soft brush to the face of the mould, fixed and prepared for use, as aforesaid; and in the meantime, another small quantity of plaster or other cement having been quickly tempered with water, to the consistency of mortar, I apply it with a trowel, as a thicker coat at the back of that first applied with a brush, and then instantly fill up the body of the work with cement, in which brick tiles or squared

stones are introduced in regular courses, or in which bricks, tiles, stones, clean washed gravel, ballast, or shingles, or other hard and durable materials, are introduced."

Masses of these and other hard substances being piled together into the form of the intended erection, the cement is to be poured amongst them in a fluid state, by which the whole becomes formed into a compact and solid mass. If the pier of a bridge or any other erection is to be made under water, the cement is prepared and conducted through tubes to the part where it is intended to be deposited.

With all this explanation of process, we do not discover in what particular part the invention consists, and therefore leave the patentee to speak for himself: "I intend to confine my said patent to the casting or constructing the parts of buildings and their enrichments, as aforesaid, in their places, and not to extend it to the casting or constructing thereof separate, or apart, from the building to which they are attached or belong; neither do I claim an exclusive right to the introduction of iron beams in the ceilings, arches, or roofs of buildings, but merely employ them in aid of my said invention."

Inrolled, November, 1822.

To FRANCIS DEAKIN, of Birmingham, in the County of Warwick, Sword Manufacturer and Wire Drawer; for his Improvement in the Manufacture of Holster Cases, Cartouch Boxes, and certain other descriptions of Cases.

[Sealed November 9, 1822.]

THIS invention is divided into three parts; first, the cases are to be made of wrought iron, rolled into sheets,

commonly called tin plates, sheet copper, or any other suitable materials, which are to be attached or connected together at their joints by solder, rivets, bolts, pins, screws, or other fastenings. The second consists in covering these cases with leather, cloth, tow, thread, cotton, calico, paper, or fibrous substances, which is ultimately to be painted, varnished, japanned, or otherwise coated. And the third is in forming such boxes or cases into suitable shapes; which being entirely at the will and taste of the workman, is considered to require no description.

Inrolled, January, 1823.

To JOHN OXFORD, of Little Britain, in the City of London, Gentleman; for his Improved Method of preventing Premature Decay in Timber, Metallic Substances, and Canvas; by the application whereof to such several Bodies respectively, the same are respectively rendered impervious to the Dry-rot, Damp-rot, Worms, Insects, or Rust, to which the same are respectively liable; and the same are hereby rendered more durable, and less liable to decay.

[Sealed November 1, 1822.]

THE specification of this invention commences by stating, that various have been the means proposed for preventing the premature decay of timber, but the desired effect appears not to have been yet accomplished by any of the methods employed. The antiseptic properties of coal tar have been resorted to in various forms, but not in the most efficacious manner, according to the views of the patentee. His objections are founded upon the fact that the essential oil of tar, which is the only preservative contained therein,

is, by the present method of application, principally evaporated, and not absorbed by the substance to which it has been applied. In consequence of this, the patentee has, by considerable labour and experiment, discovered the means of reducing the volatile oil of tar to a fixed oil; and without losing any portion of its penetrative qualities, it assumes the same unctuous tenacity as linseed or neat oil.

In making this preparation of oil of tar great care must be taken that the oil be divested of every impurity, which when affected leaves pure naptha. The oil, in order to be treated, is introduced into vessels capable of holding from two hundred and fifty to five hundred gallons each, and is there saturated with chlorine gas, by passing the gas in streams through the oil. This process must be very carefully watched, and its operation suspended as soon as the saturation is complete, that is, when the oil has imbibed a sufficient quantity of chlorine. This may be ascertained by the appearance of the oil, which changes from its ordinary black colour to a bright red; and instead of the watery substance of the volatile oil, it will assume a coagulated appearance, something like a liquid in the act of freezing. In extremely warm weather this will not appear without introducing a small quantity of the oil into a phial, and immersing it for a few minutes in cold water. After treating as above directed, the disagreeable burnt smell of the oil will be nearly removed, and the substance changed from a volatile, to a fixed oil, without the least injury to its penetrative qualities.

The oil when thus prepared is ready for use, and is now to be mixed with such ingredients as may be selected for making a paint. The materials mentioned are white lead, or red oxide, according to the required colour, of which fifty parts; carbonate of lime, well washed, twenty-five

parts; carbon of purified coal tar, twenty-five parts. These are to be mixed with the prepared oil in large mash tubs, and there suffered to remain for about twenty-four hours, in order to give time for the slight effervescence which takes place by the escape of carbonic acid gas. After this the whole must be ground in the ordinary manner of preparing paint. The ingredients have such an affinity that equal quantities of the oil and of the other materials may in general be mixed together.

This composition when first laid upon the wood which it is intended to preserve, should be thinned with an extra quantity of the oil, in order that as much as possible may be absorbed; the thicker coating of the composition afterwards will prevent the escape of the oil so imbibed. The penetrating quality of this compound is such, that if applied to timber which has been painted twenty years, the oil will penetrate the wood, while the solid part adheres to the old paint, which the oil had previously rendered soft, and hence it becomes extremely easy to scrape off the old coating; or if suffered to remain will unite with it, and become impenetrably hard; and when perfectly dry, is entirely devoid of smell.

"The utility of this compound, as a preventive to decay, is founded upon the antiseptic qualities of the fluid, and the indestructibility of the solids." In all cases where timbers are united without any intervening substance there is a great tendency to decay, which a coating of this compound would effectually prevent; it is not liable to fail in any climate, being neither affected by heat or cold. This substance when applied to iron or any other metal, entirely precludes the possibility of rust, and of course preserves it from decay. It is also applicable to canvas or any other linen substance, and is there recommended

to be laid on extremely thick, so as to close the interstices and render them impervious to rain or any other moisture.

Inrolled, December, 1822.

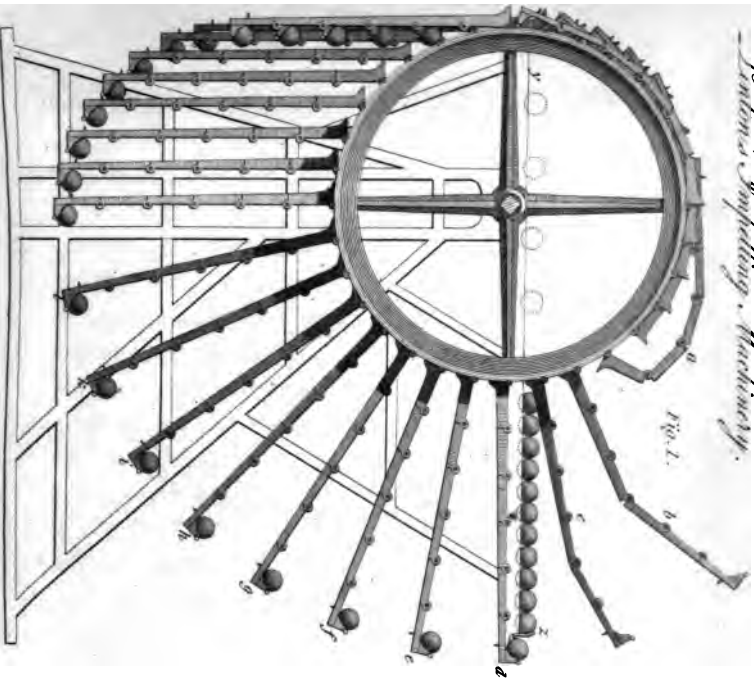
To GEORGE LINTON, of Gloucester Street, Queen Square, in the County of Middlesex, Machinist, for a new Method of impelling Machinery without the aid of Steam, Water, Wind, Air or Fire.

[Sealed, Dec. 22, 1821.]

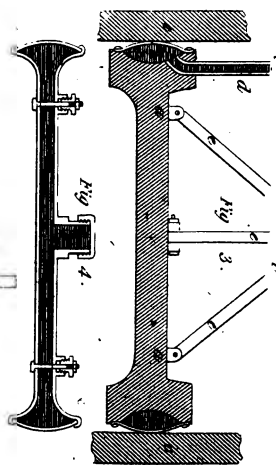
THE mechanism herein proposed is intended to be a self-actuating and perpetually revolving series of levers; it consists (as the specification drawn by B. Rotch, esq. expresses it) "in a vertical wheel moving by the laws of gravity alone; such wheel being fixed upon an axis, which axis is made to turn easily in gudgeons for that purpose, and the periphery of which wheel is provided with levers so constructed, that by the mere revolution of the wheel they extend themselves to their greatest length, and obtain their greatest acting power successively, as they arrive by the rotative motion of the wheel at that position where they become situated at the upper part of the lower quadrant of the descending side of the wheel; and in which said last mentioned position, they charge themselves with a weight at that extremity farthest from the axis. And which said levers, also cease to act as levers the moment they have passed the lower part of the said quadrant, and being carried up in an inactive state, with the ascending side of the wheel, discharge the said weight when the said weight arrives at some point above the level of the axis."

"And my said invention doth also consist in causing

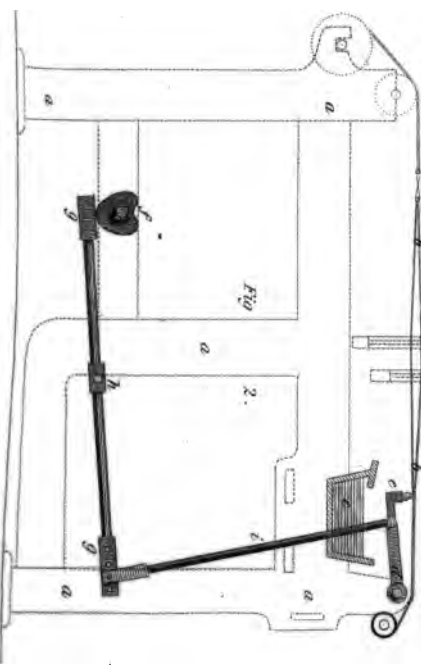
Ponton's Expelling Machinery.

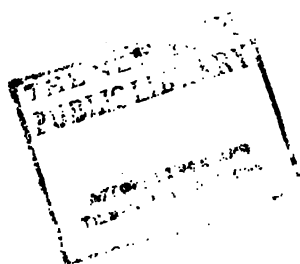


Lyne's Expanding Caston.



Storvick's Improved Power-Loom.





the said weight, and others so discharged, to return by the laws of gravity alone, to the situation whence they were taken, by the levers as before mentioned."

Plate IV. fig. 1, is an end view of the wheel with a series of thirty-two arms or levers, placed at equal distances apart round its periphery, and connected thereto by hinge joints. These arms are each formed of several flat pieces joined together by hinges, which by their own gravity fall in succession into radiant positions on one side as the wheel turns, and on the other collapse and lay close to its periphery.

a, represents one of the jointed arms in the act of falling; *b* and *c*, other similar arms, in the successive positions in which *a* would be as the wheel continues revolving; *d*, is the situation of the arm when extended to its full length and beginning to act as a lever. Here the end of each arm as it passes strikes against a small trigger, which liberates a catch and allows one of the balls, *z*, to roll from the inclined plane *y*, into the box at the end of the arm. From this horizontal position the levers successively descend by their gravity to the lowest point *m*, where they become pendant and cease to be levers.

The arms on the ascending side of the wheel hang perpendicularly from the periphery, and each carries up its ball by the preponderating gravity or power of the acting levers *d, e, f, g, h, i, k, l*, on the descending side of the wheel. Thus the balls are successively brought up and delivered from the boxes of the respective arms on to the inclined plane *y*, where they pass along and place themselves as *z*, ready to be again taken into the boxes as the descending levers pass.

This principle is considered to be applicable to a series of vertical wheels as well as a single wheel, and in that way it is recommended to be employed. At the end of

the shaft or axle of the wheel, a toothed pinion is attached, by which the moving power of this mechanism is proposed to be communicated to other machinery.

“ By way of general observation I will state, that to make my invention work with more delicacy and minuteness, it would be well to introduce friction rollers at every joint, such friction rollers to roll on the surface of the periphery of the vertical wheel, as also to have a slight spring under the first or innermost joint of each lever to press it upwards, and thereby induce it the more readily to be thrown off the vertical wheel when in the position of the lever *a*, fig. 1.”

“ It now only remains for me to describe, how the vertical wheel, or series of wheels, is to be set in motion. In the first place then, I would observe, that if none of the levers are purposely confined or obstructed in their action, there will always be a certain set formed in the positions represented in fig. 1, or nearly so. The vertical wheel or wheels, must be restrained from turning round; the inclined plane or planes must be charged with the balls as before described, and the LAWS OF GRAVITY being then allowed their natural course, by all restraint being withdrawn from the vertical wheel or wheels, a continuous motion will forthwith take place.”

The scheme here proposed has with slight varieties of detail, been so often before the public, that it would be unnecessary to make any comment upon its fallacy, did we not still find inventors deceived by its plausibility, and racking their genius to produce that, which, by mechanical means, is utterly impossible. We shall, therefore, endeavour in our next, to explain the false principles in which this *perpetual motion* is founded, and hope thereby to lay it for the future in oblivion.

Inrolled, June, 1822.

To WILLIAM HORROCKS, of Portwood, within Binnington, in the County of Chester, Cotton Manufacturer ; for his Improvement in the construction of Looms, for Weaving of Cotton or Linen Cloth, by Power ; commonly called Power-Looms.

[Sealed December 14, 1821.]

THIS invention consists, in the adaptation of an apparatus to an ordinary power-loom, for the purpose of wetting the warp and weft at stated intervals, during the process of weaving. Plate IV. fig. 2, shews the contrivance, by the representation of the end of a loom, the improved parts being engraved and shadowed, the other parts of the loom shewn by a dotted outline. *a, a, a*, is the framework ; *b, b*, the warp ; *c*, a trough (shewn in section) extending across the loom, immediately under the race of the shuttle. This trough is to contain water, or a solution of soap and water, or any other fluid applicable to the purpose ; *d*, is a short arm or lever (one of these being on each side of the loom) carrying a rod or bar, *e*, covered with cloth, or any other absorbent material ; which alternately descends into the trough, and rises up to the under side of the warp, thereby conveying a small quantity of the liquid, from the trough, to the warp and weft, and by that means giving it a degree of moisture, which will enable the weaver to compress in the fabric any quantity of weft that may be required.

The action of this lever is affected by means of a heart wheel, *f*, turned by a band passing round a rigger upon its axle, and communicating motion to it from the first mover of the engine ; *d*, is a lever, having its fulcrum at *h* ; and *i*, is a connecting rod attached to the end of the lever *g*, and to the lever *d*. It will hence be seen that

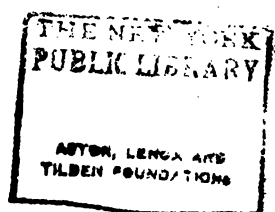
when the larger diameter of the heart-wheel acts upon the end of the lever *g*, the reverse end of that lever lifts the connecting rod *i*, and raises the arm *d*, which brings the rod *e* up to the under side of the warp, and thereby deposits a portion of the liquor upon the fabric. When the lever *g*, is in contact with the smaller diameter of the heart-wheel, then the reverse end of that lever is at its lowest point, and the weight of the connecting rod and lever brings down the bar, covered with the absorbent material, and immerses it in the fluid of the trough *c*, where it remains until again raised by the larger diameter of the heart wheel; which at every revolution causes it to strike against the under side of the warp, and communicate the moisture required.

Inrolled, February, 1822.

To JOHN HAGUE, of Great Pearl-street, Spital-fields, Middlesex; for Improved Methods of making Metallic Pipes, Tubes, or Cylinders, by the application of certain Machinery, and Mechanical Powers.

[Sealed, January 29, 1822.]

THE object of this invention is the casting of metallic pipes, by forcing the melted metal through a cylindrical mould, having a fixed core in the middle. Plate V. fig. 1, is a section of the operative part of the machinery; *a*, is a trough or pan, in which the metal is to be melted; *b*, is the furnace or fire place under it; *c*, is a hollow chest, intended to be filled with the fluid metal, through the aperture *d*. When this chest is filled, the plug *e*, is to be fastened down by the screw *f*; *g*, is the mould containing the core, of which there may be several made to



Hague's, for an Improved Method of making Pipes. 77

screw into the end of the metal chest, so as to form pipes of different diameters in the same machine; *h*, is the core formed of iron or steel, of which also there may be several, variable in diameter according to the intended bore of the pipe. This core appears to be connected to the interior of the mould at the conical part *i*, with grooves formed in that part, for the passage of the melted metal; it is not however described in the specification.

When the chest is filled with melted metal as above mentioned, the screw plunger *k*, is made to advance by the agency of any suitable mechanical power; and by that means forces the melted metal through the narrow space between the mould *g*, and core *h*. A box *l*, is placed near the end of the mould, to be supplied with cold water, for the purpose of chilling or setting the metal, as it passes through the mould; and as the screw plunger advances, the fluid metal forced into the mould, pushes that portion of the pipe which is formed out of the mould, and delivers it on to the cylinder or drum *m*.

The end of the pipe, if made of such metal as is capable of being coiled, is to be made fast to the periphery of the cylinder, and a rope bound round the block upon the axle, is passed over a pulley, having a weight suspended at its end; by which means the pipe as delivered from the mould, is received upon and coiled round the cylinder or drum as it forms. There is also a box *n*, at the back part of the metal chest, which is to be filled with water for the purpose of setting the melted metal, and preventing it from oozing out between the threads of the screw plunger. By this apparatus, metallic pipes or tubes of different diameters or calibre may be cast and delivered in a perfect state.

Inrolled, July, 1822.

To EDWARD BOWLES SYMES, Esq. of Lincoln's Inn, Middlesex; for the Invention of an expanding Hydrostatic Piston, to resist the pressure of certain Fluids, and to slide easily in an imperfect Cylinder.

[Sealed, November 10, 1821.]

THIS expanding piston is formed with a groove round its periphery, and is bound with an elastic substance, such as leather or painted cloth in the manner of stuffing, leaving a vacant space round the piston under the leather, which is intended to be filled with a fluid substance; and by the pressure of this fluid, causing the leather to bulge out round the piston, accommodates itself to the inequalities of the cylinder in which it may be employed. Plate IV. fig. 3, shews a section of an expanding piston; *a*, is the solid part of the piston; *b, b*, grooves or recesses round its periphery; *c, c*, the sides of the cylinder in which it is intended to work. Round the periphery of the piston (which is about a quarter of an inch less in diameter than the cylinder) a band or belt of leather is placed and secured by any suitable means; cords may be tied very tightly round in the narrow grooves above and below the recess *b*, for the purpose of holding the leather to its place. This belt or band, may be of painted or oiled cloth, of whalebone, horn or other flexible substance. A pipe *d*, descends from a reservoir above, by which the fluid is supplied to the recess *b*, and by its weight pressing laterally, causes the leather or other flexible band or belt to swell outwards, and fit closely to the sides of the cylinder. The reservoir above should be covered with a cap; and a cork float should rest on the top of the fluid, with a graduated rod extending above, to indicate the quantity of the fluid contained within.

Symes', for an expanding Hydrostatic Piston. 79

The arms, *e, e, e*, are bracers connecting the piston with an upper frame, which is intended to guide the piston accurately in its ascent and descent.

Elastic pistons constructed upon this plan may be distended with water, or other fluid, by pouring it into the pipe *d*, as above described; and the lateral pressure of the flexible belt, will be in proportion to the height of the column of the fluid; which must be increased, according to the imperfections in the internal surface of the cylinder, wherein the piston acts. This pressure, it will be seen, acts by gravity alone; and such a piston is proposed to press upon the surface of ale, beer, wine, spirituous or other liquors, contained in an upright vessel made as nearly cylindrical on the inside surface, as conveniently can be done by coopers' ordinary means. This piston when thus employed, is by its flexible sides enabled to sink down as the liquor is drawn off for use, and will by that means prevent the escape of carbonic acid gas, or alcoholic vapours from the liquor, as well as the access of atmospheric air to the liquor, which is known to injure its quality.

When the expanding piston is to be employed within the cylinder of a steam-engine, and there to accommodate itself to the inequalities of its internal surface, it is proposed that the fluid employed should be melted tallow or oil; and that the flexible band or belt should be formed of very thick, hard and compact woven twine canvas of the best quality, painted on the inner side. Such canvas is proposed as is usually made for engine-hose or water-pipes.

In adapting this description of expanding piston to a steam-engine, it will be necessary to provide against a much greater pressure from the steam, than could be overcome by the gravity of the fluid; it is therefore proposed to close the top of the pipe *d*, with a cap, that the fluid

may not give way. Several modifications and variations of the principles are proposed for this purpose, among which it is suggested that the piston may be formed of two plates of metal, bolted together as shown in section at fig. 4. This piston is particularly applicable to situations where there is not sufficient height to admit of an open tube long enough to give the required hydrostatic pressure. The top and bottom of the piston is made of tinned copper, or such other metal as will not corrode; the sides are formed of any flexible substance as above described, and fastened to the top and bottom by rivets or otherwise. The fluid is introduced at the centre aperture, which after the interior of the piston is filled, is secured by the screw-cap. Any degree of outward pressure may be given to the piston by screwing the nuts of the bolts closer down, and the expansive power of the steam when in action, tending to collapse or squeeze the plates of the piston together, will cause the elastic sides to press with greater force against the cylinder, and hence to produce a perfectly tight packing under any pressure of the steam.

Cast iron pistons are also proposed for steam-engines, with an aperture within to contain the fluid, and conduct it to the groove round its periphery. The rods of such pistons are proposed to be hollow, and the fluid to be introduced through them from a reservoir at top, as described at fig. 3, about six or eight feet above the level of the piston. The flexible sides are here to be of good canvas as above, and when oil can be procured sufficiently cheap, that may be employed in preference to melted tallow. The small quantity of grease that will ooze through the canvas will be sufficient to lubricate the inside of the cylinder, and save the necessity of applying oil to the outside of the piston.

Enrolled, May, 1822.

Original Communications.

To the Editor of the London Journal of Arts, &c.

SIR,

HAVING lately made some experiments on a plan which I had designed for rendering ships and fortifications shot-proof, and of causing several balls which might be fired against them to return again upon the enemy; and having found my experiments upon a small scale to answer my expectation, I beg leave to communicate the result, in the hope that it may be further considered by those of your readers, whose scientific and practical information qualify them for judging how far it might succeed upon a larger scale.

Before entering upon the detail, I think it proper to observe, that the chief utility anticipated is, in its application to merchant vessels and ships of passage, and for fortifications; but for ships of war, as it could be adopted by both parties, its effects would be neutralized; but it seems that even in this case, it would save the men from injury, and would always be in favour of the weak, and defensive side.

Plate V. fig. 2, is a cross section of a vessel, its sides being constructed upon my plan. Fig. 3, part of the side as it would appear externally. Fig. 4, is a diagram shewing the operative part upon a larger scale. Now the principle upon which I guard the ship from being penetrated by shots is, by constructing the sides of oblique or curved surfaces, for the purpose of causing the balls to glance off at an angle from the line in which they are impelled.

If a shot strikes the vessel upon the bevelled part *a*, it will glide upwards, and pass over the deck without injur-

ing the hull or any of the crew, though perhaps it may sometimes occasion mischief to the rigging ; if it strikes upon the curved part *b*, it will glide downwards, and spend itself in the water, without producing injurious consequences. But if the ball strikes against the upper surface of the inclined plane of the wedge-formed guard *c*, as shewn at fig. 4, it will rebound in the narrow curved recess, as shewn by dots, and proceed in the direction of the arrow, until it arrives at the lower side of the recess, when it will proceed back again, as shewn by the arrow, to the point from whence it was first projected. Precisely the same effect would take place if the balls struck the lower side of the wedge-formed guard ; it would then be carried round the upper part of the curved recess, and be impelled back again in the opposite direction to that in which it was projected.

There are a number of pins, at certain distances, set into the side of the ship, for supporting the wedge-formed guard ; and this guard is carried entirely round the vessel, its stern being semi-circular. The more acute the external angular form of this guard, the less must be the force by which it will be struck.

Fig. 5, represents another formed projecting side of a vessel, which though inferior and less applicable to the desired object, yet being more simple and upon the same principle, I shall describe it. *a, b*, is the side which stands at an acute angle with the water and extends some distance under its surface, but not far, as balls do not generally penetrate the hull when any considerable distance under water. *c*, is a board placed so as to contract the passage, and by the ball rebounding against this board and the side of the vessel, it will be directed into the curved channel and projected out again as shewn by the arrow.

The rationale of this plan will be, that if the ball and side of the vessel were perfectly elastic, according to the

laws of projectiles, the ball, after striking upon the inclined plane, would be reflected up and down in its progress through the passage at equal angles, and not strictly follow the course of the curve; and if the force of the ball be not too much weakened by the operation, it would be thrown off, though probably not at a proper angle, to reach the enemy. If neither the side of the vessel, nor the ball should be elastic, though perfectly hard, the direction of the ball would be turned in the curve, and following the shape of it, would return as shewn by the arrows, in figs. 4 and 5.

Since devising this plan, I have made the experiments on a small scale, and find them fully agree with my expectations. The sides of the vessel was represented by deal boards $\frac{3}{8}$ of an inch thick, and leaden bullets about one third the weight of a musket ball, were fired from a blunderbuss well charged; they made very slight impressions in the wood, and returned to a board placed behind the stock of the blunderbuss, and left a moderately deep impression in it. It is scarcely necessary to observe, that if the object of returning the ball be dispensed with, the side of the vessel or fortification may be formed in an angular shape as described. I have also to add, that a coating of grease upon the surface of the vessel will greatly assist the desired object.

I am fully aware that, however the experiment has succeeded in miniature, the great weight and force of a cannon ball might defy the precautionary plan here suggested, though it is known that slight obstructions, when opposed in an oblique direction, considerably affect their progress. It remains also to be further tried by experiment, whether the ball would be returned upon the enemy with sufficient force to injure him; and in repeating these experiments I would caution any person from stationing himself in any situation to which the ball might be re-

flected. This may be avoided by attaching a string to the trigger of the gun, or by laying a train.

These plans, of course, are intended to apply to fortification, and I am of opinion that they would then be found of even greater advantage there than in shipping.

I am, Sir, yours, &c.

LEWIS GOMPERTZ.

*Oval, Kennington, Surrey,
December 17, 1822.*

To the Editor of the London Journal of Arts.

SIR,

I WAS gratified in reading the observations of your humorous correspondent *Harkye*, in your last number, on the projected establishment of a Sub-way Company in the Metropolis. Allow me to enlarge a little on the difficulties to be surmounted, and the probable consequences resulting from the execution of so wild a scheme; though enough has already been stated to deter the most sanguine theorist from venturing his capital even in these days of speculation.

I shall briefly endeavour to shew the impracticability of the scheme, and that it cannot be generally adopted; without which, no public advantage can accrue: for the public must eventually repay the enormous expence in the execution of such unnecessary works, by an increase to the rates for supplying both *water* and *gas*.

It is too much to expect that the funds of either of the *present establishments* will enable them to take up their numerous lines of iron pipes, nearly all of which have been laid down in the last twelve years, and to redrive them in the sub-ways or tunnels as they may be constructed.

The extent of the whole it is impossible to calculate, without actual measurement; but at a moderate com-

putation may be safely stated at upwards of one thousand miles, and the capital sunk at nearly two millions.* Notwithstanding several of the new establishments have recently increased the rates to the consumers, both of *water* and *gas*, the shareholders derive little interest for their money expended; their sanguine expectations have nearly ended in disappointment.

I would ask why some of the best streets, both in London and Westminster, are even at this period without sewers; and that foul water is suffered to run from the houses into the open kennels? The reply is obvious—the enormous expence of constructing new sewers and drains in old streets; of obtaining proper currents to the existing sewers, many of which are not sufficiently deep to convey water from the basement floors, although the several commissioners have the power progressively to proceed in such works, and to levy rates to reimburse such expences, to an extent almost unlimited. Much has been done of late years, but much more remains to be done.

A new sewer under each sub-way would be indispensable; the communications between each must be very numerous; and as the projected tunnels every 25 feet, and open gratings to admit light (we may safely add dirt and filth) will ensure a continual stench and effluvia therefrom, which will certainly not add to the salubrity of the metropolis.

The necessity of new sewers being formed under every subway is obvious, in the event of the failure or fracture of a main or service water pipe. The depth of from 12 to 15 feet below the paving must be excavated to begin

* Up to the end of the year 1817, the New River Company alone, had laid more than 350,000 yards of iron pipes in the streets of London; nearly 200 miles.

to lay bricks ; the heavy expences attending such works, and the necessity of shoring to ensure safety to the workmen and the public, cannot surely have been calculated by the projectors. For the 100,000*l.* intended to be raised, would probably be expended in the distance of less than 5000 yards.

Can any theorist calculate on being empowered to demand of the Water and Gas Companies, after putting them to the increased expences of taking up and redriving their lines of pipes within their new sub-way, an annual rent of 5000*l.* for such accommodation ; the idea is too absurd to be entertained for a moment.

More serious consequences are likely to arise than is generally imagined ; by the sudden fracture of a pipe charged with gas in these subterranean tunnels, the admixture of foul and atmospheric air, in contact with a lamp or lighted candle, would probably be more terrific in its results than the explosion of fire-damps, so common in mines.

Iron pipes, for conveying of water and gas, have hitherto been cast as light as the nature of things required, calculating on the external resistance of the soil in which they are imbedded, which firmly adheres thereto, forming by the mineral properties of the metal, an incrustation so firm, that when taken up after a few years service, it is found very difficult to remove. Experience has proved this to be decisive of the durability of iron pipes, when atmospheric air is excluded. But how very different would be the result, if the pipes are to be ranged within the damp tunnels, exposed to the action of moisture and corrosion, unaided by external pressure or assistance ; a few years would be sufficient to render many unserviceable.

I will suppose that the Strand, or Fetter Lane, was selected to construct a sub-way, in either of which streets

a proper sewer is probably much wanted. There are three lines of water, and two or three of gas pipes, running parallel nearly their whole extent, of from four to fourteen inches in diameter. I would ask the projectors if the dimensions of their described sub-way, would enable the workmen to drive these several lines of pipes, and to repair or replace with new, as may hereafter become necessary?

Again, if the side walls of the sub-way are built perpendicular, I contend that they cannot resist the lateral pressure; if circular or elliptical, width or space cannot be obtained, where arched vaults and bakers' ovens so very frequently interfere; besides the depth necessary to be sunk, for both sewer and sub-way, would endanger the safety of every building; and those great thoroughfares, now made perfect with pipes and paving, at an enormous expence, would again be subjected to interruption, and annoyance, in a greater degree than any public work has hitherto rendered necessary.

R. C.

January 17th, 1823.

American Patents.

WE are favoured with an authentic list of all the patents granted for inventions in the United States of America during the year 1820; and having made arrangements by which we expect to be regularly supplied with this information, we feel pleasure in presenting it to our readers, conceiving that a knowledge of the progress of the arts in a country so closely allied to our own, will be found an interesting subject to our readers.

Bridges, improvement in building—J. Brag, Montreal, Canada, Jan. 4.

Bread Finisher—(we have no idea of the nature of this invention) E. Treadwell, Philadelphia, Jan. 10.

Ropes, &c. machine for making—E. Crain, Springfield, Vermont, Jan. 10.

Spermaceti Candles, casting or moulding, by heat applied to the mould—Wm. W. Swain, New-Bedford, Mass. Jan. 14.

Mortice water lock gate—W. Martin, Windham County, Conn. Jan. 15.

Railways and carriages, improvement in—C. Williams, Richmond, Virginia, Jan. 18.

Wheat, machine for washing, drying, and screening—S. Martin and Z. Chapin, Ontario, Co. New York, Jan. 18.

Steam-engines, raising the power of steam in, without encreasing the quantity of fuel—C. Leek, Ross County, Ohio, Jan. 22.

Canals, &c. apparatus for towing boats on—P. Cooper, New York, Jan. 24.

Bridges, improvement in the construction of—I. Town, Fayetteville, North Carolina, Jan. 28.

Oxymuriate of lime, apparatus for preparing the—J. Kendal, Lincoln, Worcester County, Mass. Jan. 28.

Ships' bottoms, coating for—J. Russel, New Bedford, Mass. Jan. 29.

Cements, water-proof—C. White, Whitestown, Oneida County, New York, Feb. 1.

Hats, elastic water-proof—A. Buffum and J. Kelly, Smithfield, R. I. Feb. 17.

Spruce beer, making of—J. Williams, Cambridge, Middlesex, Mass. Feb. 17.

Saddles, elastic seat—P. H. Martin, Nashville, Tennessee, Feb. 28.

Stove, cooking—I. Keys, Putney County, Vermont, Feb. 23.

Plough, improvement in the—P. Marshall and J. B. Smith, Lambertsville, New Jersey, March 3.

Ship-building, improvement in—A. Brewster, Hartford, Conn. March 6.

Fire-places, improvement in—E. Griffiths, Philadelphia, March 6.

Gridirons, hollowed or guttered—T. Massey, New London, Conn. March 6.

Pump, wind power—H. Bronson, Kent County, Litchfield, Conn. March 8.

Privies, improvement in the construction of—M. M. Duplat, Charleston, S. C. March 16.

Saw, circular, for making clap boards—R. Eastman, and J. Jaquith, Brunswick, Mass., March 16.

Fire hearth for vessels—J. Lamb, Amboy, New Jersey, March 18.

Coffee-roaster, improvement in—P. Williams, Baltimore, March 20.

Tobacco-press, improvement in—S. Fraser, Nottingham, Maryland, March 23.

Earth, apparatus for removing—I. L. Skinner, and S. F. Tooker, Hartford, Conn. March 23.

Fire-engines, improvement on the—E. Bryant, New London, Conn. March 28.

Locks, improvement on—H. and J. Day, New York, April 4.

Salt, boiling, improvement in—O. Parsons, Pittsburgh, Pennsylvania, April 4.

Augur for boring guns, manner of using the twisted screw—W. Holmes, Winchester, New Hampshire, April 4.

Letters, making shaded—G. Bruce, New York, April 4.

Cloth, machine for knapping and brushing up—J. Byram and S. D. Fuller, Mendham County, New Jersey, April 4.

Hoe, common, improvement on—P. M. Merrill, Kinsdale, Cheshire County, New Hampshire, April 6.

Pump, double forcing, improvement on—Sena Gillett, (administrator of Sam. Gillett,) Windsor, Conn. April 6.

Heleogastrium, or Planetarium—T. Newell, Poultney, Rutland County, Vermont, April 12.

Steam or vapour, improved application in extracting of spirits, and to working steam-engines—R. Willcox, New York, April 20.

Oven, portable rotary—R. Willcox, New York, April 20.

Brewing by steam—H. Hackley, New York, April 21.

Leather, splitting—E. Howard and J. Butters, Boston, May 3.

Canals, machine for excavating—I. L. Skinner, Hartford, Conn. May 3.

Watch-chains, machines for making—S. Kelpinger, Baltimore, May 4.

Improved mill—N. Read, Belfast, Maine, May 8.

Stove, cooking, improvement in—N. Winslow, Portland, Maine, May 23.

Boats, towing, improved mode—S. Howard, Savannah, Georgia, May 24.

Brush, white-wash, improvement in—E. S. Curtis, Charlestown, Mass. June 2.

Watch-chains, machine for making—J. Hatch, Baltimore, June 5.

Gun-stocks, machine for turning—A. Woolworth, Waterbury, Conn. June 15.

Teeth, &c. composition for preserving and cleansing—L. S. Parmly, New York, June 17.

Pills, family, Daniel Coit, New York, June 17.

Fish, method of catching by means of floating-wharfs—A. Bailey, Havre de Grace, Maryland, June 24.

Water-wheel, improvement on the—E. Hall, Baltimore, July 5.

Currying-knife, improvement in—D. Tomlinson, Brookfield, Conn. July 6.

Plough, improvement in the—J. W. Jenkins, Hudson, New York, July 6.

Power, machinery for the purpose of gaining—C. Redheffer, Philadelphia, July 11.

Balance-lever hydraulic machine—D. Fisk, Springfield, Otsego County, New York, July 18.

Linen spinning-wheel—B. Simmons, Paris, Oneida County, New York, July 20.

Gun-barrels, machine for manufacturing—T. Daking, Harper's Ferry, Virginia, July 28.

Plough, improvements in the—J. S. Wright, Greenwich, Washington County, New York, July 28.

Grain and Rice, machine for hulling—M. Fowler, New Haven, Conn. July 28.

Mapping lands, instrument for—J. Deneale, Dumfries, Virginia, Aug. 3.

Spiral helm wheel—R. P. Cunningham, Pomfret, Conn. Aug. 3.

Rapids, &c. machinery for passing boats up—L. Thuring, Dedham, Mass. Aug. 12.

Locks and latches, &c. improvement on—H. Durkee, (assignee to J. Chittenden,) Burlington, Vermont, Aug. 12.

Carpeting, making ingrained—J. and N. Haight, New York, Aug. 15.

Washing-machine, improvement on the—Benjamin Cox, Hadley, Hampshire County, Mass. Aug. 15.

Sifters or screens, wire rolling—N. Sellers, Philadelphia, Aug. 16.

Smut-machine, improvement in—J. Gillaspie, Middletown, Frederick County, Maryland, Aug. 23.

Stove, or fire-place, circular open—R. Berrian and F. Class, New York, Aug. 31.

Weighing-machine, improvement in—E. Wadsworth, Hartford, Conn. Sep. 7.

Blocks, &c. improvement in the construction of—J. Henry, Maysville, Kentucky, Sep. 13.

Longitude, improvement in the mode of finding the—J. Henry, Maysville, Kentucky, Sep. 13.

Plough, double shovel, improved—J. Ballthorpe, London County, Virginia, Sep. 20.

Plough, improvement in—R. L. and E. A. Stevens, Hoboken, New Jersey, Sep. 20.

Boats, &c. wheel for propelling—J. Prince, New York, Oct. 2.

Hats, knapping, with rabbits' fur—D. Evans, Alexandria, Oct. 2.

Common sewer mouth, improvement in—A. Ramsay, Philadelphia, Oct. 3.

Cock, improvement in the—E. Hubball, Baltimore, Oct. 4.

Spinning cotton yarn, improvement in—W. Bald, jun. Providence, R. I. Oct. 4.

Water-wheels, improvement in—D. Beauchamp, Elizabeth Town, Wood County, Virginia, Oct. 10.

Rice, &c. machine for cleaning—R. French, Morrisville, Bucks County, Penn. Oct. 13.

Power loom, improvement on the—W. Gilmour, Providence, R. I. Oct. 28.

Bark, &c. machine for breaking—N. Sears, Hudson, New York, Oct. 31.

Pans, baking or burning, improvement in—W. Burtus, New York, Nov. 7.

Valve-cock, improvement in the—J. Cluley and B. Stancliff, Philadelphia, Nov. 8.

Chimneys, machine for sweeping—S. S. Edmonston, New York, Nov. 8.

Swinging horse frame, for facilitating the shoeing of horses—J. Kirk, Weston, Windsor County, Vt. Nov. 8.

Plough, improvement in the—C. Wood and G. Brundage, Blooming Grove, Orange County, N. Y. Nov. 9.

Windmill, improvement in the—P. Etienne, New York, Nov. 14.

Bee-hive, improvement in the—E. Blake, Hartford County, Maine, Nov. 16.

Saddles making, improvement in—E. Walker, Aurora, Niagara County, New York, Nov. 16.

Winnowing-machine, improvement in—J. Brown, New London, Hillsborough County, N. H. Nov. 21.

Leather, finishing machine for—J. Burr, Johnstown, Montgomery County, New York, Nov. 21.

Yarns, improved mode of drawing and forming them into readyes—R. Graves, Boston, Nov. 22.

Cordage, &c. mode of laying—R. Graves, Boston, Nov. 22.

Yarns, &c. machine for equalizing the strain upon—R. Graves, Boston, Nov. 22.

Vessels, machinery for propelling—J. J. Giraud, Baltimore, Nov. 22.

Ram-rods, machine for making—C. C. Barstow, Exeter, N. H. Nov. 21.

Medicine, improvement in—L. Dow, Hebron, Conn, Nov. 24.

Wooden pegs for boots and shoes, improvement in the manufacture of—T. Rowell, Hartford, Windsor County, Vt. Nov. 24.

Double Speeder, for roving and spinning cotton, combination of improvements on—J. Fiske, Boston, Dec. 7.

Coopérage, machine for dowelling and heading—R. Hunt, Ontario County, New York, Dec. 12.

Books, raised fanning for—R. Hunt, Ontario County, New York, Dec. 12.

Plough, cast iron, improvement on—J. Seaver and J. Fay, Rockingham, Vt. Dec. 14.

Considering that patents are granted by the American government only to citizens, and for inventions which are perfectly original, and have never been made known or used in any other part of the world, we cannot avoid remarking (without considering the absolute merits of the subjects individually) that the catalogue here presented, exhibits, in no mean light, the inventive genius of our Trans-Atlantic kinsmen.

WE have received the following communication from Mr. Deakin, relative to his cartouch-box, which came too late to be incorporated with the report of his patent. (See page 68.)

The following are the advantages I consider my cartouch-box possesses over those made of leather :

1st. Perfect security to the ammunition in all weather or climates.

2nd. Durability from its being formed of metal, and guarded by a particular covering, varnished, which protects it from rust or corrosion, and is not liable to be chipped off by the rough usage to which it is necessarily exposed ; thus considerably reducing the price, which in the first instance hardly exceeds that of the leather now in use.

3rd. A reduction of nearly one-fourth in weight, which

on the line of march, must prove a great relief to the soldier.

The above are what I consider the great advantages, and I have no doubt, but one of those boxes will prove a saving of at least two to one, if not more.

Nobel Inventions.

Thieves' Alarm.

A VERY simple and effectual alarm for the prevention of burglary, &c. has recently been invented. In external appearance it is a narrow strip of canvas about four inches long, the centre part enclosed within a piece of coloured paper, and with a small ring affixed to each end. These rings are intended to be hung on hooks or nails, one upon the moveable part of a window or door, and the other upon the frame or post; when, should any attempt be made to enter from without, the canvas is of course extended, which causes an instantaneous explosion of detonating powder, as loud as the report of a fowling-piece; the combustible matter being confined within the coloured paper before mentioned.

This contrivance appears to possess great simplicity, and is calculated to answer its intended purpose at a very trifling expence.

Coal Gas.

A gentleman of Glasgow, an eminent experimental chemist, has, we understand, discovered a simple, cheap, and efficacious mode, of discharging from coal gas, while in the gasometer, the sulphureous hydrogen, hitherto given

off in combustion : producing the offensive smell so generally complained of, and injuring plate, pictures, or any other description of delicate and elegant furniture. Silversmiths in general, and all persons dealing in metallic articles, will be peculiarly benefited by this discovery, which it is said qualifies coal gas for lighting up the most splendid drawing-room, with as little injury to the ornaments, and as much comfort to the company, as results from the use of the best wax candles.

The Georama.

A new method of teaching geography has just been invented at Paris, by means of what the author calls the *Georama*, which he describes to be "a large hollow globe, forty feet in diameter, lighted from above, in which is the arctic pole. *In the interior of the globe the spectator is placed, upon circular stages, surrounded by a balcony, to which he ascends by a spiral staircase rising from the antarctic pole, and reaching to the centre of the globe.* On the interior of the globe is painted, with the greatest exactitude, a map of the world, according to the latest discoveries, and upon the edges of the balcony is a sort of small telescope for those who are short-sighted.

The *latter* part of this apparatus, we, ourselves, certainly need, to perceive the merit of this novel and surprising plan. Whatever advantages it might possess in facilitating the study of geography, would be more than weighed down by the expence of the apparatus, which the author modestly estimates at *two thousand guineas* : in this respect, if in no other, it is certainly a *golden road to science*.

Plan for preventing any Alterations in the Value of Bankers' Checks.

A plan has been invented by Dr. Paris, combining the advantages of simplicity and infallible success. It is by placing several lines of numerals in an inverted order, instead of the scroll at the left hand end of the cheque.

Thus,

9 8	7 6 5 4 3 2 1	Pay to Mr. ——— the Sum
9 8	7 6 5 4 3 2 1	of Seven Hundred and
9 8 7	6 5 4 3 2 1	Forty-six Pounds.

The method of using it, is this:—The lower line of figures represents units, the next tens, and so on, as far as may be wanted in the cheque, which is torn or cut off, as seen by the lines above, at the figures that show the amount stated in the body of the cheque. The result is obvious, the cheque cannot be altered, but by decreasing its value, which is certainly not an objection.

Polytechnic and Scientific Intelligence.

GREAT BRITAIN.

Proceedings of the Royal Society.

ON the 14th November, Mr. Pond, the Astronomer Royal, concluded a paper, called "An Appendix to a former paper, on the changes which appear to have taken place in the declination of some of the principal fixed stars;" and read another paper "On the Parallax of a Lyrae." The absolute parallax of the star in question, was stated to be a very small fraction of a second.

Nov. 21. Francis Bauer, Esq. F. R. S. commenced the Croonian lecture, entitled "Microscopical Observations on the Suspensions of Muscular Motion in the *Vibrio Tritici*."

Dec. 5. The same gentleman concluded the Gronian lecture. The singular animal described in it, is the cause of a particular disease in wheat, discovered by Mr. Bauer in 1807, while investigating the various diseases of that species of corn. In the diseased ears, some grains were quite ripe and dry, whilst others were impregnated germs, perfectly green, and containing cavities lined with a minute fibrous substance, every fibre of which was a worm. These worms, when moistened, were in active motion, and after being dry, and apparently dead for five days, when again moistened, were, as it seemed, resuscitated, and moved about as before. Mr. Bauer conceived that their spawn or eggs must have been introduced into the germs by the sap, as is the case with the fungus, which produces the disease called the smut in wheat. The worms are annulose, have a proboscis of several joints, and a clawed tail. They are almost opaque on the back, but more transparent on the belly, through which is seen in them strings of eggs, which are exuded through a circular aperture near the tail. In an hour and a half after exudation, the young worm peeps out, and by incessant exertion, extricates itself in another hour. The large egg-bearing worms are about one-fourth of an inch long by one-eightieth wide, and have no other motions than those of the head and tail. Some of them were revived in wheat which had been dry for four or five years; the longest period observed was six years and a month. They appear to be preserved by being imbedded in an oily mucous substance, but if kept in water more than thirty-five days, they die.

Dec. 12. W. H. Wollaston, M. D. V. P. R. S. read a paper on Metallic Titanium. In the slag from the iron-works at Merthyr Tydvil, are minute cubes which have been considered to be iron pyrites, from being imbedded in, and

possessing the appearance of, that substance. They are, however, metallic crystals of titanium. An angle of one of them scratched not only steel and ground glass, but even polished agate and rock crystal. They were not affected by nitric, muriatic, or sulphuric acids; and were infusible before the blowpipe, which, however, slightly oxidated their surfaces, though their brightness was restored by means of borax. By nitre they are oxidated, and become purple or blue, according to the degree of oxidation; and by nitre and borax in conjunction, they may be completely dissolved before the blowpipe.

The crystals, though found in the vicinity of metallic iron, contain none of that metal or of silica, for which the oxide has a strong affinity. It was impossible to ascertain the specific gravity of bodies of not more than one-fortieth of an inch square; but Dr. Wollaston endeavoured to find if they would float in melted tin, but they would not unite with that metal, nor combine with iron, silver, or copper. Their metallic nature is almost proved by their lustre, and is demonstrated by their conducting very feeble electricity. The paper concluded by remarking, that the infusibility of these cubes of metallic titanium evinced that they were not formed from a state of fusion, but by successive increments from the reduction of the oxide in the slag, which explains the natural formation of many metallic crystals.

Sir EVERARD HOME, Bart. V.P.R.S. read a paper "On the difference of Structure between the Human Membrana Tympani, and that of the Elephant." The membrana tympani is of a muscular structure, and in man of a circular, but in the elephant of an oval shape; which Sir Everard had inferred was the reason why that animal was not affected by musical sounds equally with man. This inference he has ascertained & he dis-

section of the head of an elephant only three weeks old, sent from India, preserved in spirits. The membrana tympani, measured an inch and a half, by an inch and one-eighth. The elephant hears very low sounds with great distinctness, as was ascertained by Mr. Broadwood sending a piano to Exeter Change, when the animal scarcely noticed the high sounds, but listened to the low ones with great apparent satisfaction, which Sir Everard attributes to the long muscular radii of the membrane. The lion, in the same menagerie, was likewise little affected by high musical sounds, but became perfectly infuriated by low ones.

Society of Arts.

NOTWITHSTANDING this society, during the whole of the session, has been fully occupied in considering the merits of a multitude of inventions communicated to them, yet no subject has been found worthy of their reward, or countenance. The committees of correspondence and papers, and of mechanics, have constantly met on Monday and Thursday evenings, the former for the purpose of completing the fortieth volume of their Transactions, which is expected to appear in a few days; the latter in the consideration of the following subjects:—

Apparatus for elevating cannon, by means of a moveable bed, raised or depressed by a sector rack, worked vertically by a winch and endless screw.—Leg-rest (commonly called a Chelsea pensioner) formed as a cross, by which means it cannot (as the ordinary leg-rests which are formed as a $\perp$) fall into a perpendicular position, out of the reach of the patient.—Kite, to form a communication between a stranded vessel and the shore; the kite is to be sent off from the ship, and let fall when

Arrived over the shore; it carries a rope with a small grapple, which takes hold of the ground when fallen, and by that means enables a seaman to land, and assist the remainder of the crew to gain the shore.—Marine gloves and slippers, formed something like the web-feet of aquatic birds, with joints expanding and closing, (like a parachute) by the action of the swimmer.—A method of preventing rain from insinuating itself under the frames of windows by capillary attraction. This is by placing a ledge along the window sill, and cutting a horizontal groove therein, for the purpose of drawing off the water.—Cap for a fractured or dislocated knee; the cap is of leather, with straps, and steel springs, intended to embrace and support the knee, and by its elasticity to allow of the action of walking. A lifting dock, consisting of a platform of air-tight caissons, on which is erected a timber dock, capable of receiving a ship of large dimensions; this apparatus, when used, is, by towing, to be brought near the vessel about to be repaired, which should lay at anchor in deep water; in this situation, by admitting water into the caissons, the dock is to be sunk and brought under the vessel, and when made fast to it, the whole is raised by pumping the water out of the caissons, when the dock may be floated towards the shore or into shallow water.—Ships that cannot be sunk; barrels stuffed with wool or cork shavings, are proposed to be attached on the outside of the hull along the keel.—Window-sash mounted on a sliding frame with pivots, which enable it to turn over vertically, for the purpose of getting at both sides of the glass, without the usual danger attendant on cleaning windows. Model of a circular prison, in which the cells and other apartments are so arranged, that an observer in the central part may see all that is going on within. Surgical instruments for various pur-

poses. Pan for cooking, having a rim round its bottom about two inches deep, for confining the heated air under the vessel; the rim is pierced with a few holes, to allow of the draft.—Boilers to be heated by hot air pipes surrounding them.—Convex hone for setting razors.—Compensation balance for time-keepers, to obviate that inaccuracy in their going, which arises from the accumulation of weight at the extremities of the expansion pieces, arising from the centrifugal force, which causes the momentum to fluctuate; the improvement is dividing the ring into three concentric circles.—Joining the seams of engine-hose by metal rivets instead of sewing them. Umbrella joints; the ends of the ribs and stretchers are united to the framework by screw-pins riveted into flanches or sockets.—Chest for containing arms on shipboard, in which convenience of stowage, and ready access is obtained.—Cannon loaded at the breach, by the withdrawing of a plug and pin.—Glue-kettle with a cover, by which the steam is retained, the glue kept clean, and not subject to adhere to the sides of the pot.—Hand-rest, to be employed in counting-houses, to support the hand when writing at the bottom part of the page of an account book; two wooden boards are made to rise or fall, by means of joints like those of a parallel rule, and which may be fixed to the desired height by end screws.—Candlestick containing a helical spring in its shaft, for the purpose of raising the candle as it burns down.

Surrey Institution.

SINCE our last notice of this Institution, lectures have been delivered upon the following subjects:—A course of three lectures on the Ancient Usage of Heraldic Bearings, by Mr. W. Newton.—The first opened with a discussion, proving the employment of heraldic insignia to have ex-

isted in the early ages of the world; and proceeded to shew the sources from whence we principally derive armorial bearings, as used in the present day. The distinctions observable between devices which are not armorial, and those which are, was next considered; the former of these, the insignia of trading companies, and other fraternities of civil compact were exhibited, and the seals or cognizances of private persons, as employed before armorial bearings became generally adopted. The science of heraldry was considered as purely military, and the terms arms, armorial bearings, and escutcheons, referred to the shields of the warriors; coats of arms implying the surcoats of silk worn over the polished armour, with the heraldic devices of the bearer; and achievements, figurative representations of his acts of valour, wisdom, or Christian virtues. The origin of the feudal system was traced, and its establishment in the different countries of Europe, and the general assumption of armorial devices among the feudal leaders, was considered as having given rise to many local arms appertaining to kingdoms, principalities, and cities. Armorial devices, were reduced to a system as employed by the heralds of old, when written language was but little understood; which were then possessed of emblematical significations, with considerable poetic powers. After explaining the ancient import of the respective tinctures employed in heraldry, the honourable ordinaries were described, and their figurative allusions; the minor devices and partitions of the shield were also explained, and a general review taken of the allegories conveyed by the great variety of bearings, animate and inanimate, which may be judiciously appropriated as heraldic figures.

The first lecture closed with remarks upon the misappropriation of these powers in latter times; examples

of which were adduced, of a character highly ludicrous, and derogatory to the dignity of the science.

The second lecture treated of knight-errantry, as arising from an endeavour to repress the licentiousness of the feudal ages, and to protect religious devotees in their pilgrimages to the Holy Land. This spirit of chivalry, associated with a fanatical superstition, led to the expeditions of Crusade, or Holy Wars; the narrative of which, with certain anecdotes arising therefrom, introduced a great variety of heraldic devices derived from this source. Orders of religious knights were mentioned, and the foundation of the fraternities of Hospitalers, Templars, and Teutonic; and the subsequent expulsion of the Christians from Syria. Many paternal shields of arms were derived from the crusades, before which time they are not considered to have been hereditary; and about the same period surnames became general among the upper orders, having been first introduced in the reign of William the Conqueror, by the principal barons, and not become universal among the people until the beginning of the fourteenth century. The original sources of surnames were then considered, and divided into their respective characters and import; and the several languages of which the English tongue is formed, being considered, accounts for our ignorance of many names, which appear to be without signification.

The third lecture explained the origin of tilts and tournaments, some of which, performed in London, were described. Heraldic decorations, external of the shield, were considered; as crests, coronets, helmets, supporters, collars, mantles and mottos; all of which were traced to their original derivation, import, and causes of appropriation. The different degrees of nobility and their respective significations were described, with the armorial deco-

tations peculiar to each. Heraldic differences or marks of cadency, distinguishing the several branches of one family, were pointed out, and the modes of marshalling or associating of several coats together; with the plan of arranging family genealogies.

Funeral processions came next under consideration; and the meaning of the different parts, and characters composing them. Those commonly called *genteel funerals*, are attended by a procession of persons representing the military followers of a feudal chief. The undertaker as herald, advances first to declare the achievements of the deceased, followed by the porters of his gate; then the plume, representing his cask and beaver, resting upon the shield, and born by his esquire; after which the body, covered by his mantle, and supported by marshal's companions in arms. Hence the extreme absurdity of such mournful pageants, in modern times, attending the obsequies of private individuals.

Monumental devices were considered, and traced to our pagan ancestors, who hung up the trophies of departed heroes in their sacred groves. The gothic style of architecture, formed upon this model, exhibits the shields and armorial devices of christian warriors, as parts of its decorations; but the introduction of Grecian or Roman temples, with pagan altars or urns, supposed to hold the ashes of the dead, are ill-suited to our christian profession, and at variance with the practice of our country. The lectures concluded, by shewing the usefulness of this science as a key to history and biography; as well as in general researches into the antiquity of our nation, and the propriety of its employment at a time, when literature was but little known, or confined to an inhabitant of a cloister.

Mr. GURNEY, has just closed a most interesting series of lectures, on the elements of Chemical Science; during the course of which, he has developed some views on this subject, which appear to be as important, as they are new and striking. At this late period of the month, we are not able to enter into a general abstract of these lectures; but we cannot let them pass without referring, however slightly, to a few of the original ideas and experiments, put forth during their progress.

Mr. Gurney commenced the lectures, by an amusing historical sketch of those curious researches, under the title of Alchymy; which, in his opinion, (of which we can form no doubt,) have led to the present distinguished position of modern chemistry, as a regular science; and concluded the introductory lecture, by an eloquent eulogy on chemistry, as an agent of the practical arts of life. The rest of the course, with the exception of the last lecture, consisted of a clear and scientific development, of the elements of the science; the plan of this development, and nearly all the experiments by which it was illustrated, being entirely new.

We have only space, however, to allude, in particular, to the original views and theories, now brought forward to the world. The most striking among these, is a theory of crystallization; which, supposing Mr. Gurney to be able to establish, on secure mathematical principles; we have no hesitation in pronouncing involve discoveries of the most brilliant and important nature; and which need give way to none in modern chemistry. We have only space at present, to say; that Mr. Gurney's theory, accounts, most satisfactorily, for all the hitherto anomalous points, in this most curious, and difficult subject; that it fully explains the formation of the crystals of fluor, spar, &c. without having recourse to the spheroids, and oblate spheres of Hook, Dr. Wollaston, &c.

But the most important point of these lectures, as connected with the practical arts of life, is Mr. Gurney's introduction of his newly invented safety blow-pipe, which includes the wonderful properties of at once—*perfect safety*, and a power equal to at least ten times that of any other instrument of the kind hitherto in use. To those who are acquainted with this subject, it will be sufficient to say, that Mr. Gurney's blow-pipe is capable of permitting the use of a flame of the mixed gases twelve or fourteen inches in length when required,—that no known substance resists its power,—that a platinum wire a quarter of an inch in diameter, melts before it almost immediately; tobacco-pipes have been converted into perfectly transparent glass, and a steel file had a hole burnt through it in less than half a minute. It will be recollected that the flame produced by the common condensing blow-pipe, is not more than three-fourths of an inch long, and that the late Dr. Clarke, in using that instrument, considered it as a complete triumph of art to be able to melt a platinum wire the size of a knitting-needle. Even this was effected at imminent risk, several destructive explosions having taken place, and Dr. Clarke latterly resorted to the expedient of building up a brick wall between himself and his instrument.

Besides these two striking novelties, Mr. Gurney's lectures, including several others of minor importance; in particular the discovery and developement of a most curious and interesting analogy between musical and chemical combinations, and the intimate connection of each with the theory of *definite proportions*. We hope to see these lectures given to the world in a tangible form; in which case we shall pay further attention to them.

A course of seven lectures, Historical, Critical and Experimental, on the latest Improvements and present state of Philosophical Science in Britain and the Conti-

ment, by Mr. J. RENNIE. The subject, which constituted these lectures, were principally insulated portions of the most superficial parts of science, thrown together with the utmost incongruity; and the remarks which accompanied them, not the most refined, and frequently of an extremely pertinacious cast.

Two courses of lectures are now commencing at this institution, one by Dr. CROTCH on Music, the other by Mr. WOODWARD upon Electricity.

THE NETHERLANDS.

THE Society of Arts and Sciences of Utrecht, has proposed, amongst others, which do not come within the province of our journal, the following questions, as subjects for the Society's prizes, for 1823.

An historical and critical description of the improvements that have been made in the construction of sea-barometers, during the last forty years; especially on the proper means to observe the elevation, and the least alterations of the fluid in the tube, notwithstanding the movement of the vessel.

What influence do iron cannons on board, and the iron used in the construction of a ship, exercise upon the declination, and upon true and correct observation of the maritime compass? How to annihilate this influence, or else determine it; and the manner of laying down with sufficient correctness, to the elucidating the observations that may be made? They desire at the same time, a critique of the indications that Flinders, Sabine, Barlow, (See our Journal, Vol. III.) Lecount, and others, have given to this effect; and their deductions from the observations.

What influence do they exercise upon the going of a sea time-keeper? What are the best means to annihilate this influence, or else determine it; and the manner of

ascertaining it as a known quantity, in the computation of the going of the time-keeper. The author of the reply to this question, will much increase the merit of his work, if he will enrich it with the results of the experiments and satisfactory observations, made by himself.

How is it known, that heat subtracts power from the artificial loadstone; and on the other hand, it seems to result from the experiments of Scoresby and Erman, that not only does heat augment the action of the natural loadstone upon iron, but that by heat can be given to iron a permanent magnetic power; whilst it is admitted, the intensity of the magnetic power of the earth, increases towards the poles, or regions of the greatest cold? They ask, how all these apparent contradictions can be reconciled; and if the galvano-magnetic phenomena recently discovered, throw any light upon these difficulties?

The answers are to be sent to M. J. F. L. Schroeder, Secretary of the Society, and Professor of the University of Utrecht; to the first and second questions, before Oct. 1st. 1824: and to the others, by Oct. 1st. 1823. They are to be written in Dutch, French, German, English, or Latin.—REV. ENCY.

New Patents Sealed in 1823.

To Joseph Woollams, of the City of Wells, in the county of Somerset, Land Agent, for certain improvements in wheeled carriages of various descriptions, to counteract the falling and facilitate the labour of animals attached to them, and to render persons and property in, and near them, more secure from injury.—Sealed, December 5th.—6 months for enrolment.

To Joseph Egg, of Piccadilly, in the parish of St. James's, Westminster, gun-maker, for certain improvements in the construction of guns and fire-arms upon the self-priming and detonating principle.—Sealed, November 26th.—2 months for enrolment.

To Samuel Parker, jun. of Argyle-street, in the parish of St. James's, Westminster, bronzist, for certain im-

improvements in the construction of lamps.—Sealed, December 10th.—2 months for enrolment.

To Matthew Wilks, of Dartford, Kent, seed-crusher, for his method of refining oil produced from seed.—Sealed, December 20th.—6 months for enrolment.

To Thomas Linley, of Sheffield, Yorkshire, bellows-maker, for his method of increasing the force or power of bellows.—Sealed, December 20th.—2 months for enrolment.

To William Johnson, of Great Totham, in the county of Essex, gentleman, for a means of obtaining the power of steam, for the use of steam-engines, with reduced expenditure of fuel.—Sealed, January 8th.—6 months for enrolment.

To George Miller, of Lincoln's Inn, in the county of Middlesex, Brevet Lieut. Colonel in the Rifle Brigade, for his method or plan of communicating the spiral motion to shot and shells, when fired from plain barrels, and for igniting, by percussion, shells to which the spiral motion has been thus communicated.—Sealed, Jan. 16th.—2 months for enrolment.

To Robert Copland, of Wilmington Square, in the parish of Clerkenwell, in the county of Middlesex, gentleman, for his combinations of apparatus for gaining power, part of which are improvements upon a patent already obtained by him, for a new or improved method, or methods of gaining power, by new or improved combination of apparatus, applicable to various purposes.—Sealed, January 16th.—15 months for enrolment.

To William Lister, of Baildon, in the parish of Otley, in the county of York, cotton-spinner, for certain improvements in the method and machinery for preparing and spinning wool, silk, mohair, or other animal fibre, of any quality, or length, of staple.—Sealed, January 16th.—6 months for enrolment.

To Junius Smith, of Old Broad-street, in the city of London, merchant, for certain improvements on a machine for washing, cleansing and whitening cotton, linen, silk, and woollen garments, or piece goods.—Sealed, Jan. 20th.—6 months for enrolment.

To James Taylor, Esq. of Lloyd's Coffee-house, City of London, for a new method of constructing the bottoms of merchant's ships, and placing the pumps, so as to prevent damage to the cargoes by the brack water.—Sealed, January 16th.—2 months for enrolment.

D. H. M. S.		D. H. M. S.	
1 0 0 0	♂ in its ascending node, lon. 10° 29' 52".		at Greenwich. Long. 10° 21' 39'. Lat. 1° 21' n.
2 3 35 45	♂'s 3rd Sat. eclipsed.	10 15 20 0	Ecliptic Conjunction. or New moon.
2 7 57 29	♂'s 3rd Sat. will emerge from its shadow.	11 13 59 0	♂ in conj. with ♀ long. 11° 30' 37". Dif. dec. 30° 32' ♀ 70° 54' S. ♀ 11° 26' S.
2 8 5 28	♂'s 1st Sat. will emerge from its shadow.	11 17 41 0	♂ in conj. with ♀ long. 11° 50' 40". Dif. dec. 5° ♀ 70° 1' S. ♀ 6° 56' S.
2 10 48 0	♂ in quadrature entering the last quarter.	13 12 1 43	♂'s 2nd Sat. eclipsed.
3 0 0 0	♂ in Perihelion.	13 23 45 0	♂ in conj. with ♀ long. 0° 40' 59". Dif. dec. 40° 32' ♀ 60° 5' N. ♀ 100° 57' N.
4 0 0 0	♂ at his greatest elongation.	17 20 59 0	♂ in conj. with ♀ long. 1° 28° 30". Dif. dec. 50° 25' ♀ 240° 27' N. ♀ 190° 2' N.
4 0 0 0	♂ in conj. with ♀ long. 10° 25° 36'. Dif. dec. 25° ♀ 10° 28' S. ♀ 1° 3' S.	17 23 16 0	♂ First quarter.
4 10 43 0	♂ in conj. with ♀ m. long. 8° 7° 3'. Dif. dec. 2' ♀ 26° 4' S. ♀ m 26° 2' S.	18 6 26 5	♂'s 1st Sat. will emerge from its shadow.
5 0 0 0	♂ in Apogee.	18 21 47 0	♂ enters ☊.
6 12 0 28	♂'s 2nd Sat. will emerge from its shadow.	21 0 0 0	♂ in Perigee.
6 0 0 0	♂ station. long 11° 50' 46".	24 6 31 18	♂'s 2nd Sat. will emerge from its shadow.
9 9 37 46	♂'s 3rd Sat. eclipsed.	24 17 20 0	Ecliptic opposition ☊ Full moon.
9 10 1 15	♂'s 1st Sat. will emerge from its shadow.	25 8 21 56	♂'s 1st Sat. will emerge from its shadow.
9 12 0 23	♂'s 3rd Sat. will emerge from its shadow.		
10 0 0 0	☉ Eclipsed invisible		

METEOROLOGICAL JOURNAL.

1822.	Thermo.		Barometer.		Rain in inches.	1823.	Thermo.		Barometer.		Rain in inches.
	Hight.	Low.	+	-			Hight.	Low.	+	-	
Dec.						JAN.					
27	34°	21°	.	-.02	..	11	31°	24°	+.07	.	..
28	30	15	.	-.08	..	12	30	21	.	-.11	..
29	33	18	.	-.12	..	13	30	22	.	-.11	..
30	31	16	.	-.12	..	14	29	15	.	-.05	..
31	31	23	.	-.03	..	15	27	20	+.04	.	..
JAN.						16	34	19	+.02	.	..
1823.						17	33	25	+.05	.	..
1	33	27	+.02	.	..	18	33	21	+.01	.	..
2	40	30	+.14	.	..	19	21	4	+.08	.	..
3	43	35	.	-.03	..	20	30	4	+.09	.	..
4	41	35	.	-.02	..	21	33	24	+.07	.	..
5	41	34	.	-.11	27.5	22	28	20	+.04	.	..
6	43	35	+.17	.	22.5	23	25	21	+.01	-.01	..
7	42	36	+.08	.	..	24	28	19	+.17	.	..
8	38	30	+.01	-.02	..						
9	33	23	.	-.04	..						
10	32	23	.	-.01	..						

Lower Edmonton.

C. H. ADAMS.

LITERARY NOTICES, &c.

Mr. Horner has published a Prospectus of his Panoramic view of London, taken from the summit of St. Paul's Cathedral. It contains an interesting account of the origin, progress, and completion of the undertaking; and of the vast range of the metropolis and surrounding scenery, which form the subjects of the engravings intended to be published.

The Rev. W. Buckland, Professor of Mineralogy, at the University at Oxford, is printing a description of what he calls an Antediluvian Den of Hyenas, discovered at Kirkdale, in Yorkshire, in 1821, containing the fossil remains of the hyena, tiger, bear, elephant, rhinoceros, hippopotamus, and sixteen other animals, all formerly natives of this country. The Rev. Professor's paper on this subject, read to the Royal Society, recently obtained the Copleian Gold Medal.

A work called *Pharmacopœia Imperialis* is about to appear. It is to consist of a comparative view of the Pharmacopœias of London, Edinburgh, and Dublin, with notes.

A work is announced at Paris called a General and Universal Bulletin of Scientific Intelligence and Notices, dedicated to the learned of all countries.

Mirza Djiaffar, a young Persian, has published at Tauris, a handsome edition of *Gulista de Saady*, the types of which were cut by himself.

A Dutchman, named Meerman, has printed two quarto volumes to prove that printing was invented at Haerlem, and the magistrates of that city have, of course, complimented him on his work.

Shortly will appear, *Observations on the Dangerous Effects of Lightning at Sea, &c.* with an account of a new application of Conductors of Electricity to the masts of ships; by W. Snow Harris, Member of the Royal College of Surgeons.

Capt. Betham has brought from Madras, a collection of rare and valuable curiosities, illustrative of the manner and State of Society in India. We understand that they will soon be exhibited, with the addition of an Indian Cosmorama, consisting of 104 beautiful drawings.

Mr. Casati has recently brought from Egypt, several ancient manuscripts, amongst which is one, in Greek, sixteen-feet six inches in length and seven inches in breadth, purporting to be a deed of sale drawn in the Thebais in the 4th year of the reign of Cleopatra, (113 years before Christ.)

The new edition of the great work of Egypt, by the French Savans, proceeds with great rapidity.

One of the most important works lately published in Russia, is the Grand Atlas of the Russian Empire, the Kingdom of Poland, and the Grand Duchy of Finland, finely engraved on 70 sheets in folio. The concluding part of the Great Russian Dictionary, in six volumes, compiled by the Imperial Society, is also published.

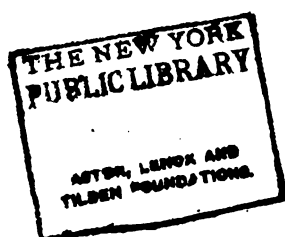
M. Automarchi, Professor of Anatomy in the Universities of Pisa and Padua, and Physician to the late Napoleon, and M. le Comte de Lasteyrie, are publishing a set of Anatomical Plates, with descriptions. The whole will form a perfect topography of the human body.

NOTICES TO CORRESPONDENTS.

We feel obliged by the communication from Lancaster, but the invention has been anticipated in two or three instances. See Transactions of Society of Arts Vol. XXVIII.

We have no further information upon the subject on which J. B. writes; should we be able to procure any it shall be communicated.

The request of Mr. S.— shall be complied with.



Brunei's Improved Steam Engine.

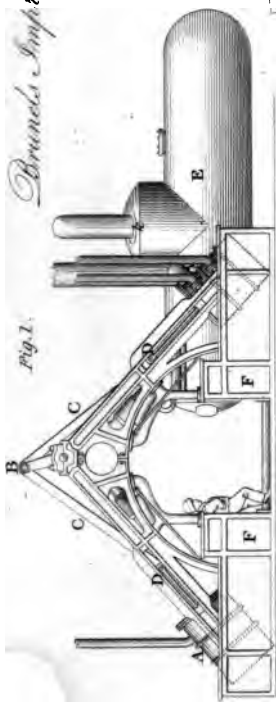


Fig. 1.

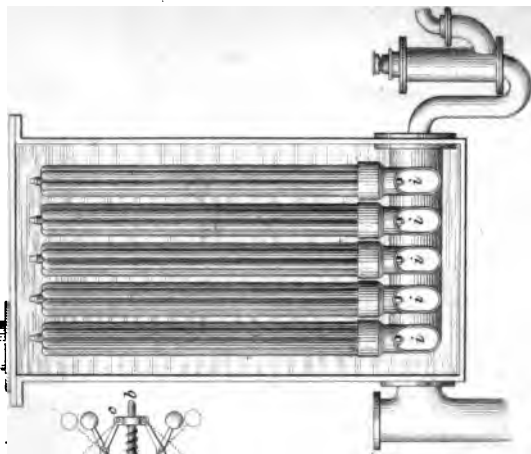


Fig. 4.

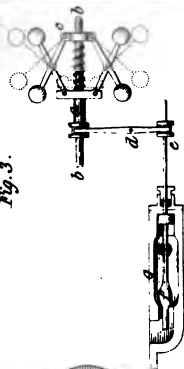


Fig. 3.

Fig. 2.

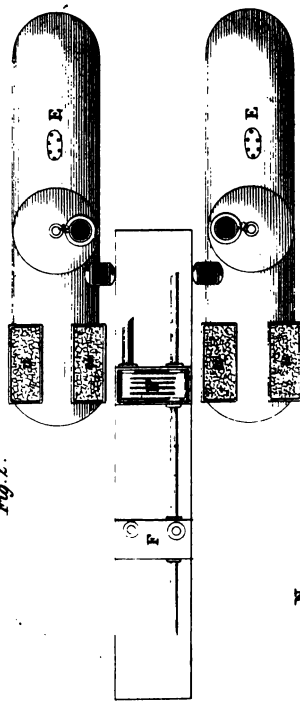
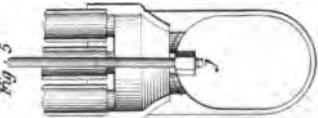


Fig. 5.



D. Wilkinson on the Tides.

Fig. 6.



R. Newton del.

J. Bacon sculp.

THE
London
JOURNAL OF ARTS AND SCIENCES.

No. XXVII.

Recent Patents.

To MARC ISAMBARD BRUNEL, of Chelsea, in the County of Middlesex, Engineer, for certain Improvements on Steam Engines.

[Sealed June 26, 1822.]

THESE improvements are limited to such Steam Engines as are employed for the purposes of navigation, and consist first, in the manner of disposing and combining two engines so as to apply their powers in the most direct way for producing a rotary action; secondly, in the method of moderating and regulating the movements of these engines and producing an equable action; thirdly, in the mode of condensing the steam; and, fourthly, in certain adaptation to the boilers.

The disposition of the engines is such that the piston rods move in directions at right angles (or nearly so) to

each other, by which their powers are exerted upon the crank in a direct line at every stroke. Plate VI. fig. 1, represents the manner in which the engines are proposed to be placed, A,A, are the cylinders, B, the crank, C,C, the connecting rods, D,D, the guide rollers: fig. 2, is a plan or horizontal view of the boilers E,E, and condenser F,F. The crank is acted upon alternately by both engines, the velocity of which is regulated by a governor.

As the common governor applied to land engines, which revolves horizontally, cannot be made to operate at sea where the vessel rolls, a modification of that apparatus is proposed, in which the balls or flyers revolve vertically; fig. 3 represents this contrivance, the dotted lines shewing the situation into which it would be thrown by the centrifugal force of the balls when the engine acted with more than ordinary velocity. In adapting this apparatus for the purpose of a governor to a marine engine, its parts must be accurately balanced, so as to neutralize the power of gravitation.

Two pairs of cross arms are employed as seen at fig. 3, which by turning upon their centre pivots are enabled to expand or collapse. The ends of two of these arms are connected to a box *a*, which slides upon the revolving shaft *b*, the other two are attached to a shoulder *c*, which is fixed upon the shaft. The arms are expanded by a worm spring embracing the shaft between the box *a*, and shoulder *c*; and at the outer extremity of each of these arms a ball is attached, which as the shaft revolves in a vertical direction, will, by their centrifugal force, fall into the position of the dotted lines. A double forked lever *d*, turning upon a pivot, acts at one end in the groove of the sliding box *a*, and at the other upon a rod *e*. This rod *e*, moves a plug *f*, within the tube *g*,

which forms part of the steam passage. It will hence be seen that when the action of the engine encreases, the balls by flying out will draw the sliding box *a*, and cause the shorter end of the lever *d*, to push the rod and plug *f*, toward the end of the tube *g*, and by that means contract the orifice through which the steam passes. The action of the engine at sea, will by this construction of governor be at all times regulated, for when the velocity is too great, the supply of steam becomes reduced, and consequently the action lowered: on the other hand, if the engine is sluggish, the balls remain as shewn in the figure, and the steam way is left unobstructed.

As sea water is found to corrode the boilers of steam engines and injure the machinery, it is proposed to employ fresh water for the generating of steam, and by condensing again the whole of the steam produced, the quantity of water in the boiler will remain always nearly the same. For this purpose, the condensor proposed is formed of a combination of pipes, to be surrounded with cold water, by which a very extensive surface for refrigeration is produced, and the condensation effected with great rapidity. Fig. 4, is a section of the sort of condensor proposed, the situation of which as connected with the engine is seen in figs. 1, and 2, at F, F. It consists of an assemblage of large pipes *i, i, i*, called the mains, connected to bunches of smaller pipes, each being an independent chamber, which collectively forms a steam vessel of considerable capacity. The bunches of pipes are affixed to the mains by means of long screw bolts *j, j*, which pass down through the centre pipe of each bunch. They are let into their respective sockets at bottom, which are formed in a sort of cup, (shewn enlarged at fig. 5,) and these cups are attached to the mains, and the whole made fast by the long screw bolts. The steam

on occupying this vessel becomes immediately condensed, and the water thus produced is returned to the boiler by a small force pump. As it is necessary that a constant supply of cold water should be furnished to the condenser, a pump connected to the moderator draws off a portion of the heated water at every stroke of the engine, and a corresponding quantity of cold water is at the same time admitted.

It being a desideratum that the weight of the boiler should be as little as may be consistent with its capacity and required strength, it is proposed to adapt to steam ships, one or more steam rooms. The boilers being constructed in the form of cylinders with spherical ends, which is the strongest shape, it is proposed to raise cylindrical steam rooms *k, k*, fig. 1 and 2, the height of which is not limited. The cylindrical body of the boiler is intended to be kept entirely full of water, and if there is but one steam room there will be but little agitation of the water when at sea. A steam room might be formed by means of a chamber laid in the parallel direction of the boiler, but the form and position above described is preferred.

It is to be observed that by the mode of condensation above proposed, there will be no excess of water, and if any waste should take place the boiler cannot be affected by the reduction of one third of its quantity, provided that the steam pipes are made of copper, or such other yielding material. The fire-places are intended to be within the boilers, and entirely surrounded by the water; the feeding of the fire is to be effected by admitting coal through several apertures from hoppers *u*, as seen at fig. 2, the bottoms of which have grooved cylinders according to the ordinary mode employed for feeding furnaces.

Many parts of the detail of these engines it is not thought necessary to explain, because they are not

claimed under this patent, and must be varied according to circumstances. As in the navigation of rivers and fresh water lakes, the common mode of condensing may be preferred to the new one proposed, it is scarcely necessary to say that a common condensor and air pump may be attached to the marine steam engine constructed upon the above principle.

The specification concludes by saying: "My improvements in these engines are limited to the application of the powers in the most direct way for producing a rotatory action, by placing the lines of the powers nearly at right angles with each other; to the moderator with its governor; and to boilers of the construction and with the adaptations which I have proposed and specified. My improvements in the mode of condensing the steam may be applied to the engines in common use, but as the adaptation of it must depend upon the construction and position of the engine, it is impossible for me to point out the mode of adapting it under all circumstances. My improvements on boilers are also applicable to engines now in common use."

Inrolled, December, 1822.

*To WILLIAM WARCUP, of Dartford, Kent, Engineer;
for his Improvements upon a Machine for washing
linen cloths, cotton cloths, or woollen cloths; whether
in the shape of piece goods, or of any article made up
of linen cloth, cotton cloth, or woollen cloth.*

[Sealed, December 10, 1821.]

THE washing machine in question consists of a trough about six or eight feet long, with an oscillating beater

or presser, the cross section of which is shewn in Plate VII. fig. 6. The cloth is placed in the trough at *a, a*, between the beater *b*, and the sides *c, c*. Water is supplied from a cistern above, which descending through a pipe, introduces itself at the end of the machine into the lower trough *d*, from whence it rises through small apertures into the large trough *a, a*, above. The sides *c, c*, are boards made with joints which enable them to fall back for the purpose of introducing the cloths or taking it out of the machine. These sides are made fast by means of wedges or blocks *e, e*, placed against them before the machine is put in action. The beater or presser *b*, is formed by a series of round rails set into a frame, between these the water passes freely as the beater vibrates upon its pivots, which rest in sockets at the end of the machine; *f, f*, are a series of ribs set against the boards on the sides of the trough, opposite the spaces between the rails of the beater, by which as the beater oscillates the cloth is squeezed and the operation of cleansing it most effectually performed. There are a number of small apertures in the boards *c, c*, for the purpose of permitting the dirty water and other foul matters to ooze through, when the cloth is pressed by the beater against the ribs and sides of the machine; and which may be occasionally drawn off by the cocks *g, g*.

The oscillation of the beater is effected by means of the levers *h, h*, two of which are attached to the upper part of the beater near its ends and connected by cross rails extend from them along the sides of the machine. The beater is to be worked by manual labour, in a similar manner to the working of ordinary fire engines. It is however in the contemplation of the patentee, to put these machines in action by means of a steam engine, water wheel, or other power.

When the water employed has become so foul as to require removing, a cock is opened at one end of the lower trough *d*, and the dirty water drawn off; upon closing which, clean water is introduced at the other end of the trough by the cock and pipe of the cistern above-mentioned. The parts of this machine are made capable of taking to pieces, so as to pack together in a small compass for the purpose of portability.

The particular improvements claimed under this patent, are first, in the manner of supplying washing machines with water from a cistern above, by a pipe and stop-cock; secondly, in the moveable sides, which fall back for the purpose of introducing the cloth to the trough and of withdrawing it after it has been operated upon; thirdly, in the introduction of the ribs on the sides, by which the dirt is effectually squeezed from the cloth, and the position of the folds changed at every vibration of the beater. The materials of which this machine is proposed to be made are principally wood, but any other suitable substance may be employed.

Inrolled, February, 1822.

To JOSEPH EGG, of Piccadilly, in the Parish of St. James's, Westminster, Gun-maker, for certain Improvements in the construction of Guns and Fire-arms upon the self-priming and detonating principle.

[Sealed, November 26, 1822.]

THESE improvements consist in the adaptation of a priming magazine or chamber to be attached on the outside of the barrel; and in the means of conducting the powder from this chamber to the pan or touch-hole, for

the purpose of priming the piece; and also in a mode of cutting off the communication between the touch-hole and the priming-chamber at the time that the piece is discharging.

The external appearance of the gun and lock is not different from other purcussion guns, which are discharged by a plug falling into the touch-hole. Plate VII. fig. 3, represents part of a double-barrelled gun; the chamber for holding the priming powder is a recess or groove *a*, between the barrels, the cover being removed for the purpose of shewing the chamber. The priming-powder (which for this construction of lock must be a detonating composition) is to be deposited in the recess *a*, and there secured by shutting down the cover, which fastens by a spring bolt. On raising the muzzle of the piece, the powder descends to the broad part of the chamber *b*, and then passes through the small apertures *c*, *c*, in a lateral direction. The outer part of these apertures are closed by a sliding plate *d*, shewn in the next figure, as connected to the action of the cock.

Fig. 4, represents the interior of the lock, the construction of which is no otherwise different from ordinary gun-locks, than by the addition of the sliding plate *d*, and the connecting parts by which it is made to act. When the cock is raised, as in the figure, an aperture *z*, in the plate *d*, comes opposite the passage *c*, in the barrel, and permits the priming-powder to descend through it to the pan or touch-hole *e*. That side of the plate *d*, which slides against the barrel is perfectly flat, but the outer side has a small protuberance (as shewn by the section of the plate *d*, at fig. 5,) in order to form a cap or cover to the pan or touch-hole. The aperture *z*, above-mentioned, passes through this protuberance in a curved direction to the touch-hole, and hence when the piece is at half-cock,

as in fig. 4, the priming passes through this passage and deposits itself in the touch-hole: but on pulling the trigger the tumbler *g*, brings down the lever *h*, which by its connection with the arm of the sliding plate, causes the plate instantly to rise up from its position at fig. 4, to the position as shewn by dots; by which means the communication between the priming-chamber and the touch-hole is cut off.

A similar priming-chamber may be applied to fire-arms intended to be primed with gunpowder, but in that case it will be necessary to enlarge the passage leading from the chamber to the pan, and a differently constructed lock must be employed, with a flint and hammer. The patentee states, "I do not, however, claim any novelty in the lock or any other part of the piece except in those parts which are marked with letters and referred to as above. In short, my improvements in the construction of guns and fire-arms upon the self-priming and detonating principle, are confined to the construction of a priming chamber attached to the barrel or barrels of any description of fire-arms, either as shewn in the drawing, or varied in any other form, place, or position contiguous to the barrel; and in the necessary shield or sliding guard, which may be varied in shape and position for the purpose of admitting the priming to the touch-hole when the piece is loading, and of cutting off the communication between the chamber and the touch-hole when the piece is discharging."

Inrolled, January, 1823.

To WILLIAM BRUNTON, of Birmingham, in the County of Warwick, Engineer, for his Invention of certain Improvements upon Fire Grates, and in the means of introducing Coal therein.

[Sealed 26th June, 1822.]

THESE improvements consist in a grate formed of sliding bars, by the motion of which the fuel is progressively advanced upon the grate, and the clinkers and other incombustible matter ejected at the hinder part of the furnace, into a vessel placed to receive them. This peculiar construction of grate, the Patentee designates a PERISTALTIC GRATE.* The improvements further extend to a mode of introducing the coal to the furnace, and of regulating its supply.

The entire length of the furnace, of which the improved fire grate may be considered to be the floor, is described as embracing three distinct points in the invention. First, that part of the grate, next the door or front of the furnace, called the close or dead part, upon which the coal is introduced; secondly, the middle or open part upon which the combustion is carried on; and thirdly, the hinder or exit part from whence the clinkers and other incombustible matters are voided into a box, or other receptacle, placed at the further end of the ash pit.

These three parts of the grate are constructed by bars extending the entire length of the furnace. That portion of them, which is called the close part of the grate, is formed by the bars lying parallel, and nearly in contact

* Peristaltic is that vermicular motion of the guts, which is made by the contraction of the spiral fibres, whereby the excrements are pressed downward and voided.—*Todd's Johnson.*

with each other, leaving as little space as possible between them; the length of which may be from eighteen to twenty-four inches from the front. Those parts of the bars, which form the open or fire part of the furnace, are so reduced in breadth or extended laterally, that air may freely pass up between them, and dust descend through to the ash pit beneath. And that portion of the grate, called the exit part, is formed by the bars lying close together, and parallel as at the front part, which may extend from nine to twelve inches in length.

For the purpose of moving the coal and fire forward upon the grate by slow progression, so that the furnace may fuel itself, and eject the dust and clinkers, only half the bars are fixed, the alternate ones being moveable, and capable of rising up, and sliding forward simultaneously by a sort of crank movement which raises the fuel, carries it forward, and ejects the clinkers and other incombustible matter into a receptacle at the end of the furnace, from whence they may be withdrawn at convenient opportunities. Both the series of bars (if that should be preferred) may be made to move alternately, so as to carry the fuel forward; or the bars may be placed upon an inclination descending forward, and by giving them a reciprocative action, the progressive advance of the fuel will be effected.

Various modes may be adopted to produce these motions of the grate bars, but the following one is recommended as particularly eligible for that purpose. "Two or more bearers are constructed, extending the whole width of the grate, and moveable round their own axis, which I call excentric or revolving bearers, having at proper intervals, suited to the thickness of, and width between, each alternate grate bar, circular bearings having from half an inch to an inch excentricity with the

axis of the bearer; these bearers I connect by wheels, namely, a wheel of equal diameter of each bearer, and an intermediate wheel between, so that the said excentric bearer revolves in the same direction and in the same time; having excentric circular bearings for the grate bars in the same position. The said bearers have gudgeons extending from their ends, and are thereby supported upon the side walls of the ash pit, under the open or fire part of the grate bars, and each alternate moveable bar having proper projections with curved feet, suited to their respective excentric circular bearings, rest thereon; the excentric bearers being turned round by the power of a steam engine, or any other convenient power which will communicate to the alternate bars the required motion; that is by the excentricity of the circular bearings, the bars resting thereon will be raised above the fixed bars, move onward in the direction in which the excentric bearers are turned, and at the end of their range fall below the fixed bars, upon which they deposit the fire, and while depressed, return to repeat their action upon the fire."

The action of both sets of bars, as described in the second construction, may be effected in a somewhat similar manner; and the third construction having the bars inclined downward, may also be put in motion by means of revolving excentric bearers. To prevent the admission of air at the dead part of the grate between the bars from the under side, while they are rising and falling, the Patentee states that he casts "a tooth as wide as the parts of the bar to which they are attached, and about two inches in the other direction, and about six inches long, which projects downwards into a trough extending from side to side of the grate, and is filled with sand or water, in which the said teeth are immersed and work, sufficiently

deep to prevent air passing under them when the bars are elevated. When the said tooth is used at the exit end of the grate, the said sand or water trough rests upon the wall which forms the end of the open ash pit, and encloses the receptacle for the clinkers and scoria; and when the said tooth is used at the dead end of the grate, the said sand or water trough is carried by the side walls of the ash pit, and the space between it and the front of the furnace is enclosed either by an arch of brickwork or an iron plate, the whole width of the ash pit, and extending from the said trough to the front of the furnace, to which I attach an upright plate, in which there is the fire door opening fitted with a door, and a small door at the bottom of the said front plate, for clearing under the close part of the bars, the said upright plate extending high enough to communicate to the roof of the furnace, and thus enclose the dead or close part of the grate bars, by which free access of air is excluded therefrom."

In the roof of the furnace over the dead part of the grate a feeding aperture is formed, which may be made either perpendicular or sloping, through the whole thickness of the brick-work, or through a channel formed in a part of the boiler, as may be most convenient. To the upper part of this aperture a feeding hopper is attached, and at the bottom of the aperture a sliding plate is placed and adjusted to the required width of the delivering passage. Beneath this is another plate, having a reciprocating motion communicated to it by the steam engine, or otherwise, by which the coal falling upon it, through the aperture above, is from time to time let fall on to the dead or close part of the grate.

For the purpose of giving motion to the grate bars, a bevel cog wheel is attached to the end of one of the

excentric revolving bearers, which takes into another bevel cog wheel attached to an upright shaft, extending above the boiler to any convenient distance. At the upper end of this shaft, a toothed wheel of about thirty inches diameter is attached, into which a pinion works of about five inches diameter, driven by and fixed upon a shaft extending from the engine or other source of power. The speed may be altered either by means of conical drums, or by a series of pulleys of various diameters, and by several other well known modes of regulating the speed of a driving shaft, by which the motion of the alternating bars may be suited to the required heat, or other circumstances. Upon the above mentioned vertical shaft another wheel may be employed with a conic or excentric curve, which being brought round by the revolution of the shaft, puts two levers in action, which moves the feeding plate backward and forward for the purposes above described.

The methods of feeding the furnace with fuel, as proposed above, are also applicable to the feeding of ordinary fires; and where there is no convenient mode of connecting the power of a steam engine, to produce the required motion it may be found desirable to employ a weight suspended by a chain and pulley, so as to give the rotatory action, and by that means to cause the sliding plate to vibrate. In order to prevent the weight from running down too rapidly, the following contrivance is proposed. Two vessels somewhat similar to an hour glass are provided; the upper one is filled with sand, upon the top of which the weight rests; a small aperture is made in the bottom of the upper vessel, by which the sand is permitted to run through into the lower vessel, and by that means the weight resting thereon gradually sinks. This sand should be calculated to run for the

same length of time that the quantity of coal contained in the hopper will be delivering itself into the grate; and when the hopper is again filled, the weight must be raised and the vessel of sand turned over in the same manner as an hour glass. The motion of the discharging plate may be effected also by means of a cylinder or air vessel and piston, in which, by the pressure of water, a piston shall be made to sink, and by means of a chain connected thereto and passing over a pulley, the power will be communicated.

In these peristaltic grates the smallest coals may be employed, and if any of the pieces are larger than will pass through a ring of four inches diameter, they must be broken before they are put into the hopper. It is to be understood that the improvements which form the subject of this patent do not consist in the invention of the fire feeder, as that is embraced in a patent granted to the same William Brunton, for "certain improvements in steam engines, and furnaces of steam engines, &c." dated 29th June, 1819, but are here described for the purpose of rendering the novel parts clearly understood.

"The improvements which form the subject of the present specification consist first, in the means, that is the motion communicated to the grate bars, which I now employ and have above described, by which the fire is progressively conveyed through the furnace, and the clinkers and other combustible matter deposited in a close receptacle, constituting what I designate a peristaltic grate, and which I apply to the furnaces for steam boilers; coppers for brewing; stills; and evaporating vessels; to reverberating furnaces for smelting or refining metals; to furnaces for heating gas retorts; to furnaces for stoves or ovens; for annealing glass or cast iron; or to furnaces to which the said peristaltic grates

are applicable; and secondly, in introducing coal by means of the coal receiver described before, upon my said peristaltic grates or other grates, to which the same may be applicable, and regulating the same by means of the said sand regulator, or the said hydrostatic cylinder and piston already described."

Inrolled, December, 1822.

To THOMAS PARKIN, of Skinner Street, Bishopsgate Street, in the County of Middlesex, Merchant, for the Invention of an Improvement or Improvements in Printing.

[Sealed, November 24, 1821.]

THESE improvements consist in the construction of an apparatus for the purpose of applying and distributing printing-ink, or colouring matter, upon the face of types, blocks, plates and tables of every description, which require to be furnished with ink or colour, for the purpose of giving impressions. This apparatus is a frame carrying an elastic cylinder, which being charged with the ink or other colouring matter, communicates the same to the face of the types, blocks, &c. in rolling over them.

Plate VII. fig. 1, is a side elevation of this apparatus and fig. 2, a cross section of the frame, shewing such of the parts as are not seen in the former figure: *a*, is a square frame of metal, capable of sliding backwards and forwards upon a number of small guide rollers *b*, which are adjustable by means of nuts and screws. Short arms hang down from the frame *a*, supporting the pivots of the inking-roller *c*, which is covered with the elastic substance usually employed for inking-rollers, and re-

ceives its supply of ink or colour by passing over a table or plate of metal *d*.

As the moving frame is drawn out by its handle, *e*, the ink or colour is brought on and distributed over the surface of the plate *d*, by means of the elastic furnishing-roller, *f*. This roller is mounted upon a carriage, and traverses over the plate or table at right angles to the direction in which the inking-frame moves. The furnishing-roller receives the colour upon its surface by coming in contact with the colour boxes, *g, g*, at each end of the table or plate; these boxes being formed hollow on their delivering side, and covered with a fine wire gauze or other porous material, through which the ink oozes. The distribution of the ink is first effected by means of small rollers pressing on the upper surface of the furnishing-roller, and secondly, by the furnishing-roller passing over the table or plate of metal, *d*; lastly, by the inking-roller itself, which in crossing the plate, spreads it still further, and distributes it in a most complete manner.

The traversing motion of the carriage and roller, *f*, along the table is produced by cords or catgut bands attached to shackles connected to the carriage at *h, h*, which bands pass over pulleys, as shewn in the figures, and their ends are made fast to the cross bar of the carriage, *a*, at *i*; by which means, as the frame and inking-roller is drawn forward over the face of the types in the direction of the arrow at fig. 1, the carriage of the furnishing-roller is drawn along the table or plate, *d*, from one box, *g*, to the other; and upon the return of the inking-frame, the furnishing-roller is carried along the table or plate back again to its former situation. Thus the ink or colour is taken from the boxes, and distributed upon the plate, *d*, from whence the inking-roller, *c*, spreads it

over the width of the plate, takes it up, and carries it to the types or blocks ready for their giving the impression.

“ This apparatus is applicable to most descriptions of printing presses, and may be placed either behind the press, or in front, or elsewhere, as may be found most convenient. I do not claim the use of elastic inking-rollers for furnishing ink upon types or other similar surfaces, or for the fixing of the said rollers in a moving frame to roll over the types or other similar surfaces (generally), but only in the particular arrangement of the parts of the apparatus, as hereinbefore described. At the same time I make claim generally to the employment of the small furnishing roller, *f*, hereinbefore described, which moves or rolls along a table or plate for the purpose of supplying ink or colour to the same, in a direction perpendicular (or nearly so) to the motion of the inking-roller, *c*, and by which it is distributed over the types, blocks, and other similar surfaces, so as to ensure an equality of colour in printing. The transverse motion may be given to the furnishing roller, *f*, in many ways, still producing the same effect ; the form and proportion of the various parts of the apparatus may be varied according to the discretion of the workmen, as well as the materials of which the same may be made.”

Inrolled, May, 1822.

To OWEN GRIFFITH, of *Tryfan, Carnarvonshire, Gentleman*, for an *Improvement in the Principle and Construction of manufacturing or making Trusses, for the cure of Ruptures or Hernia, in whatever part or parts of the body it may be situated.*

[Sealed, October 18, 1821.]

THE truss here proposed is an elastic bandage of steel

embracing the body, and united in front by a clasp or other kind of fastening, at which part the pad or pads are affixed, and by the pressure of this steel bandage the hernia is retained. The principal feature of novelty is the form in which the steel bandage is bent upwards on the sides, so as to pass above the hips and by that means to attach itself securely to the body, without the possibility of being shifted by the ordinary action of walking, or in any degree interfering with the motion of the thighs. The form of this steel bandage is shewn in Plate VII. at fig. 7, in which there are adjusting holes for fixing the front pads and drawing the bandage to its required tension. Fig. 8, is the double truss complete, with the two front pads and two back pads; the object of the latter is to produce a counter pressure to the front pads, and by their extended surfaces, to assist in keeping the former in their proper places without the employment of any under straps, which are generally found galling to the wearer. The back pads may be attached to the band by screws, or be formed as part of it in the forging of the steel.

The truss here proposed may, by proper modification, be adapted either to a single or double rupture, or to umbilical hernia in any stage; and the patentee does not confine himself to any particular method of attaching the pads to the bandage, or of uniting it in front, but considers his invention to consist in the peculiar sort of bandage above described; that is, in the curved figure which his improved bandages are made to assume, in order to admit of their passing above the hips.

The patent also extends to the machinery by which these steel bandages are formed, which consists of an iron block with curved sides corresponding to the shape of that part of the human body, around which the bandage is intended to be fitted. The steel being heated to a state

fit for welding, is made fast at one end to the block, and hammered until it has assumed its desired form.

The specification concludes by saying, " I do not mean or intend hereby to claim as my invention the use of elastic steel bandages for trusses, such being already in use; but I do hereby claim as my invention, the particular curvatures given thereto; the steel band going entirely round the body; and the manner of uniting and securing the ends of it, so as to allow of the necessary movements of the body without disturbing the pad or pads; the manner of forming and affixing the back pads to the band; and lastly, the machines whereby I give the requisite curvatures to the bands."

Inrolled, April, 1822.

To James Taylor, Esq. of Lloyd's Coffee House, City of London, for a new Method of constructing the bottom of Merchant Ships, and placing the Pumps so as to prevent Damage to the Cargoes, by Bilge Water.

[Sealed January 16, 1823.]

THE method of constructing ships' bottoms here proposed, consists in forming them something sharper than usual, and constructing gutters for the drainage of the water, both fore and aft, and thwart the vessel under the flooring; by which means, however much the ship lies out of her perpendicular position (not exceeding *five streaks*) the bilge water will run towards the centre, and be always in a situation to be operated upon by the main pumps. In the ordinary construction of merchants' ships, the bottoms are so flat, that, on a small inclination of the vessel, the bilge water runs to the side leaving the main pumps dry, and frequently causing considerable damage to the cargo. This inconvenience is considered

Clayton's Improved method of High Building.

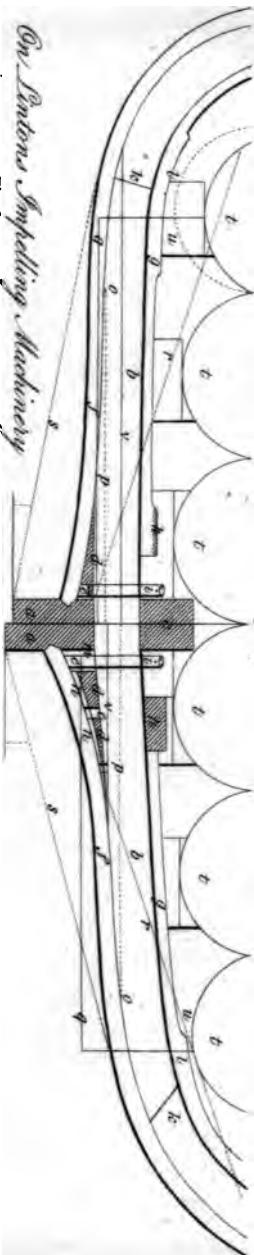


Fig. 1.

On Pontoons Employing Machinery.

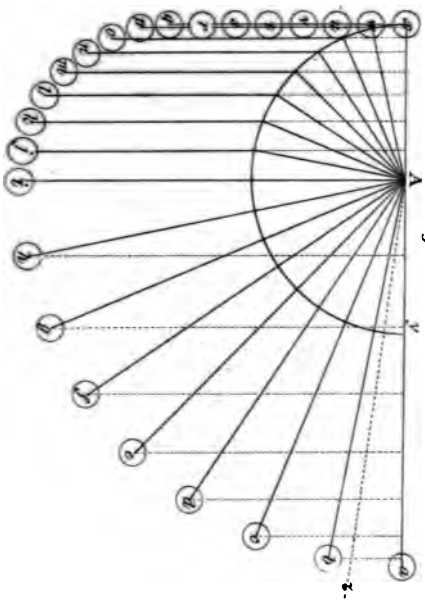


Fig. 3.

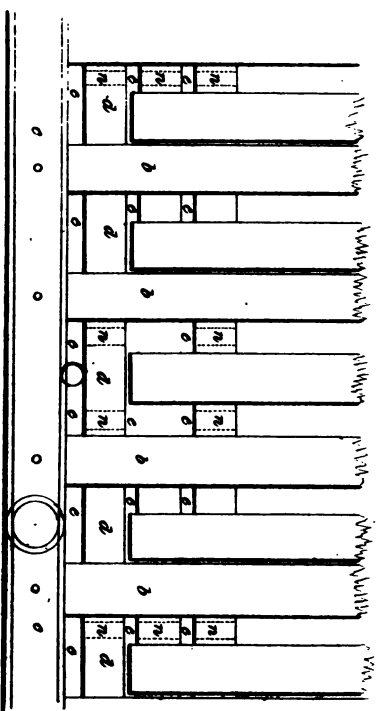


Fig. 2.

THE LIVER AND
TUBER TUBERCULOSIS.

to be perfectly removed by the new method of construction, and a vessel so built combines great additional strength and capacity for stowage, with perfect security to the cargo against the washing of the bilge water.

Plate VIII. fig. 1. is a main section thwart a vessel. That half on the left of the keelson marked A, is precisely upon the old construction, that half on the right of the keelson marked B, is according to the new plan, by which the comparative advantage of the latter is seen: fig. 2, is a plan of part of the bottom of the vessel according to the improved mode, the respective letters referring to the corresponding parts, as far as they exist in both plans: *a a*, is the keel; *b b*, the floor timbers; *c*, the keelson; *d d*, chocks; *e e e*, gutters running fore and aft; *f f*, the bottom or external planking; *g g*, the ceiling or covering in of the floor timbers; *h h*, limbers streaks; *i i*, the main pumps; *k k*, the floor; and *ll*, the thick stuff; *m*, two and a half plank side keel.

“In the old construction the dead rise is usually about half an inch to a foot across the floor, which on a floor of fourteen feet, at twenty-six to twenty-eight feet, beam would be seven inches; the timber being reduced on the outside towards the floor heads two inches, would leave five inches inside rise, which is the usual bottom of vessels from three to four hundred tons built for stowing well. To such a vessel, I propose giving a wider floor with the same proportion of rise, so that the floor being increased to sixteen feet between the *simarks*, will give eight inches outside, and six inches inside rise, with an additional security to the bottom and safety to the cargo.”

The thwart gutters, *n*, are formed by perforations cut through the underside of the chocks, by which the water is enabled to run from the sides into the fore and aft channels, *e*, while the chocks prevent it from washing

back the bilge upon any sudden roll of the ship, and thus retain a sufficient quantity of water at all times in the well, so that the pumps are never dry. In fig. 1, *o o*, is the simark in each construction of vessel; *p p*, dotted lines shewing the difference in the rising of the two bottoms; *q q*, the respective levels at which water must stand to enable the pumps to draw; *r r*, angle of five streaks list in each construction of bottom; *s s*, the line at which the vessels would respectively take ground; *t t t t*, hogshead of sugar stowed; *v v*, the comparative level in each vessel where there is twelve inches of water in the well; *u*, is the height to which the water must rise before it could damage the cargo.

The specification proceeds to describe minutely the order in which the different parts of the wood-work of the vessel are to be laid down in building a ship upon this construction, which of course cannot be interesting to the general reader. "The combined advantages of this invention, must appear at once evident to any person at all acquainted with the properties of a ship, by giving strength to the centre equal to a ship of 1000 tons, and not only giving encreased strength and security to the bottom, but obviating the necessity of placing the safety of cargos and lives on bilge pumps, which are often out of order. The danger of perishable goods being damaged in the bilge from washing is also prevented, as the chocks and openings will act as so many stop waters. The important object of holding a good wind is also obtained, and the stowage not in the least diminished but rather improved; while the draught of water will not be increased more than two inches, as the keel may be diminished outside, and the bottom have a greater spread. Great advantage must appear evident from the pumps being placed below the level, similar to drawing a mine,

and preventing any accumulation of water, for as they will stand in a corner near the keel, the smallest quantity of water will instantly appear on the sounding rod. There is scarcely any situation in which a ship can be placed at sea, except being thrown on her beam ends, which can prevent the water from finding its way to the centre, and consequently to the pumps; as a diagonal line drawn from the exterior-end of the thwart gutters, shews that a loaded vessel must be gunwale under before the water can rise over two inches of dunnage in the bilge, and in the event of leaks towards the ends of the vessel, the outward openings would receive the water in almost any position. The quantity of water estimated to be contained in the whole of the gutters and well in a ship of 400 tons is about 300 gallons, no part of which can have the least wash whatever; the whole being below the upper surface of the chocks."

Inrolled, February, 1823.

Original Communications.

Dr. Wilkinson on the Theory of the Tides.

To the Editor of the London Journal of Arts, &c.

SIR,

Herewith you will receive a short essay on my Theory of the Tides, which if you think worthy a place in your valuable work, you will oblige me by inserting.

Of all the phenomena of our planet, there are not many more difficult to explain than the causes of the flux and reflux of the sea. To this important subject our greatest astronomers have directed their attention: but to all the theories hitherto advanced there are insuperable objections. In the earlier periods of science, it does not

appear that any conjectures were ever indulged in as to the cause; this may in part arise from the philosophers, whose works have been transmitted to us, principally residing on the borders of the Mediterranean, where the influence of the tides is very trivial. Homer, speaking of Charybdis, says, "Thrice each day it rises." Charybdis is only a whirlpool in the straits of Sicily. Horace mentions tides as a phenomenon he had heard of, "*Quæ mare compescant causæ.*" In the Syrtic and Adriatic, in the Faro of Messina, and the Euripus, Dr. Shaw particularises tides; the two latter are merely currents.

Pytheas, of Marseilles, who lived about the time of Alexander the Great, states his opinion of the tides being governed by the moon. We had no demonstrations attempted before the period of the celebrated Des Cartes, who introduced his "System of Vortice," to explain the principle of regulation by the moon's motion. Kepler, who first suggested the influence of a gravitating principle in nature, with respect to the cause of the tides, entertained an extravagant supposition of the earth being a living animal, and the flux and reflux of the sea results of the action of respiration. Galileo supposed tides to be produced by the different velocities of the annual and diurnal motions of the earth; if so, the tides should occur at the same periods, without variation in their rise; but they are observed to move through the 24 hours, and vary daily in their elevation.

The illustrious Newton, in his Principia, has stated his opinion that there is an attractive power existing between all bodies in proportion to their quantity of matter, and the inverse duplicate ratio of their distance, and hence has reduced to geometrical demonstration the varied influence of the moon as she moves in her orbit, how the

tides are governed by her nearest and most remote distance from the earth, the changes observed from the different inclinations of her orbit to the ecliptic, and from the irregular motion of her nodes. Whether such a force or power be hypothetical or real I presume that the geometrical demonstration will not be affected. If gravitation be not admitted as a principle competent to explain the phenomena, we must substitute some other agent capable of producing all the effects observed.

Supposing the mean distance of the moon from the earth to be sixty times the radius of the earth, and if the law of gravitation be assumed, according to Newton, as diminishing as the square of the distance increases, it will be evident that 60 multiplied by 60, being equal to 3600, will express this proportion, viz. that 3600lbs. on the surface of the earth, removed to the moon's surface, would only weigh 1lb. As the waters of the ocean are the only part of our planet susceptible of any change from such an influence, the tendency of the waters of the ocean towards the centre of the earth will be in the same proportion diminished. Let us suppose the gravitating powers of the waters of the ocean, when under the direct influence of the moon, to be diminished in this proportion, viz. $\frac{1}{3600}$. From the law of pressure, with respect to liquids, the action is equal in every direction, and which action is attributed by Newton to the power of gravitation being uniform; if this power be disturbed in any part, there will be a determination of water to that part, till the equilibrium be restored; and the elevation of the waters in that part will constitute the tide. Let us suppose the mean depth of the ocean 4 miles, thus $\frac{1}{3600}$ part of this being elevated will be about 6 feet. Newton does not confine the diminution of gravitation in the water of the ocean merely to the influence of that luminary; he

supposed a co-operation of the sun, which he concludes, from its quantity of matter compensating for its greater distance, produces an effect about one-third of that of the moon; so that when combined, as in new moon, their united effects would under such circumstances produce an elevation of eight feet. When the moon is in her quadratures, *i. e.* when she appears to us as a half moon, then they counteract each other, and the tide will be proportionate to the difference, viz. by the above supposition, 4 feet, constituting what is denominated neap tides.

These admeasurements are only assumed for the purpose of illustration. It is well known that at the same period there is a spring tide at new moon, at the nadir, as well as at the zenith part of the earth; this presents the greatest difficulty to the Newtonian theory. If, according to the Newtonian hypothesis, an elevation of those waters which are in a direct line with the moon at or near her meridian, is to be referred to the cause aforementioned, the same hypothesis is extended to account for the tides on the opposite side of the globe, to the earth itself being attracted from the waters situated at the nadir. If we consider the elevation of the waters on each side of the globe to be eight feet, it is evident that the earth must, by the attractive power of the luminaries, have been removed 16 feet. However incomprehensible this theory is, the difficulties are increased by the application of the same principle to the explanation of spring tides at full moon, when the earth is placed exactly in a line between the two luminaries.

In the year 1799, I published an Analysis of a Course of Lectures. I therein attempted to explain the phenomena of the tides, on the principle of the motion of the earth round the centre of gravity of the earth and moon.

A ſimilar explanation had been ſurmiſed by the learned Dr. Wallis in 1666. I am not aware that he attempted any demonſtration of ſuch an opinion. In the different courſes of lectures I have delivered during a period of near thirty years, when upon the ſubject connected with the tides, I have invariably attributed them to the reſult of this motion. In the firſt place it will be neceſſary to preſent a few obſervations as to the centrifugal power of the earth, and the effect produced by this motion as to its form. The figure of the earth is extremely complicated, indeed its exact ſhape will never be aſcertained until the terreſtrial arcs are meaſured in every direction: although the late accurate ſurveys of Delambre and Mechain indicate a diminution in the terreſtrial degree from the pole to the equator; they likewise evince that the law of this diminution is very irregular, and that its two hemiſpheres are not equal on each ſide of the equator; conſequently the earth cannot be a ſolid of revolution. In the ſouthern latitude of $33^{\circ} 18'$ La Caille found the meaſure of a degree greater than at $40^{\circ} 11'$ north lat. From theſe admeaſurements it is deduced that the equatorial diameter exceeds the polar axis by 23.7 miles. If we ſuppoſe the form of the earth, before it was in motion, ſpherical, when the motion round its axis was induced, the earthy maſs not being then in a conſolidated ſtate, would, from the laws of centrifugal motion, aſſume a ſpheroidal form, and a depression at the poles. This elevation of matter muſt be one-half the difference of the two diameters, viz. 11.85 miles. But the mean diameter of the earth exceeds the polar axis by the laſt ſum. In order to bring into calculation the actual quantity of matter thus raiſed by the centrifugal power of the earth, we have only to aſcertain the difference between a ſphere of 7923.44 miles in diameter, and a ſphere of 7911.85 miles,

and this difference is to the whole globe as 1 to 220. As the mean density of the earth is greater than the density of the elevated portion,—and from the experiments of Maskelyne and Cavendish, we are authorised to consider the increase as one third,—the results will be a near coincidence with that diminution of gravitation under the equator, being estimated from a series of accurate experiments with pendulums, to be as 1 to 289. Had the velocity of the earth been 17 times greater, the centrifugal power under the line would have counteracted gravitation, and no such circumstance as weight could have existed at the equator.

The earth does not move in a regular elliptic orbit round the sun, but describes a series of volutes round the centre of gravity between the earth and the moon. As the density of the moon is to the density of the earth as 11 to 9, which has been deduced from calculations of the space the moon falls below the tangent of her orbit in a given time; as the diameter of the moon is 2161 miles, therefore is in proportion to the mass of earth as 1 to 49,22; from these data it is evident that the distance of the moon's centre from the common centre of gravity of the earth and moon is as 39.786 to 1, or 5880 miles from the centre of the earth.

It will hence appear that the earth has a triplicate motion—one round her axis, constituting day and night; one round the sun, constituting the year; and a motion in common with the moon round the centre of gravity.

In one lunar month the earth may be considered as describing an orbit whose radius is 5880 miles, or in round numbers about 1200 miles per day. The axis of the earth is to be considered as the centre on which the earth revolves. It is evident that the centrifugal power is the greatest at the equator, and constantly decreasing towards

the poles, in the proportion of the squares of the radius of the earth to the square of the sine of the complement of latitude; so that at the poles the centrifugal power will be evanescent.

If the radius of the earth had been 17 times greater, the centrifugal power would have been increased, as the square of 17 equal to 289. As the loss of weight at the equator is to the gravitation as 1 to 289, it is evident that this loss increased 289 times, the motion round the axis, in that part of the globe, would have exactly counteracted gravitation, as before observed.

The centre of gravity of the earth and moon is a point in a direct line between the two centres: at new moon and full moon, viz. when the moon is in Syzygy, this point is perpendicular to the earth's orbit. When the moon is at her quadratures, this point is nearly in the line of the earth's orbit.

The proportion of elevation of the waters of the ocean has been stated as to spring and neap tides to be as 11 to 7.

The effects resulting from the influence of two powers on a third are similar to the celebrated problem of three bodies, and which has been the object of the researches of all the great geometricians: even the celebrated La Place only attempts an approximation. The third power let us consider as a constantly varying power induced on the earth, and whose effects will be proportionate to the deviation effected with respect to the diurnal and annual motion of the earth.

If all the motions of the earth were uniform, no such phenomena as tides would have occurred; as the earth varies in its orbitary velocity, varies also in its motion as to the centre of gravity, from the variation of the line of direction, and round which point her motion is regulated as the moon may be in apogæum or perigæum.

As the fluid part of the earth is the only portion which could be influenced by any variations of motion, as we know the mass elevated, if we could ascertain the depth, we could then appreciate the power employed requisite for the production of such an effect. Supposing water be estimated at one-fourth the mean density of the earth, and the power exercised to be calculated on the supposition that the same power universally diffused would be competent to raise a column of water 11 feet high all over the surface of our globe, the proportion of this mass to the globe itself, in round numbers, is as 1 to 1,500,000.

This communication will principally be confined to observations on the different elevations of the tides, and to demonstrate that they accord with the afore-mentioned varied motion of the earth.

As the moon goes round the earth from west to east, the motion of the swell of waters on the earth's surface is in the same direction; and in the same direction are the motions of all the planets on their axles, and nearly in the same plane as their motion of projection; it must evidently appear that a third motion, constantly varying in its direction, will induce a corresponding variation of action, and the oscillatory motion of the waters will be in the same proportion.

La Place has given us the result of observation on the tides at Brest for six consecutive years. The tides augment and diminish with the lunar parallax, but in a greater ratio; thus when the parallax is increased one-eighteenth, the total tide increases one-eighth in the syzygies, and one-fourth in the quadratures. As the greatest variation of the diameter of the moon is one-fifteenth, the corresponding variation of the total tide in the syzygies, is three-twentieths of its mean height. As the greatest distance of the moon from the earth is 256,785 miles, and

its least distance 223,211 miles, therefore her mean distance is 240,000. When the moon is at her greatest distance, or, as it is termed, in her apogæum, then her parallax or apparent diameter will be the least; when at her least distance, or in perigæum, her parallax or apparent diameter will be the greatest, being a difference of 33,574 miles. Hence, when the moon is in her perigæum, the radius of motion of the earth will be about 800 miles less than in apogæum. It might be supposed that the tides ought to be higher when the moon is in her apogæum, in consequence of the radius of motion being increased; whilst the reverse is the case. Upon more minute investigation we shall ascertain that the motion of the earth is increased when nearest to the moon: and if so, the waters ought then to increase in elevation agreeably to observation.

It is an universal law in all the planetary movements, first demonstrated by Kepler, that they all describe equal areas in equal times; hence the shorter the radius of motion, the greater the velocity of the planet in its orbit round any centre: thus we are nearer the sun in winter than in summer, and the earth at that period moves quicker in her orbit, so that if the orbit of our earth were to be divided into two equal parts, the earth is eight days more traversing the summer half than she is the winter half. As the centrifugal power is as the square of the motion induced, it is evident why the tides should be higher at this period than when the moon is in her apogæum, and which agrees with observation.

The greater the elevation of the waters at high tide, the greater the depression of the low tide which succeeds it. From the principle of the rotation of the earth round its axis, every part which has the moon for her zenith or nadir, will in the course of the revolution be equally in-

fluenced; the determination of those waters to their respective points will occasion a corresponding depression, which will be the greatest at the intermediate point, viz. at 90 degrees on each side of the meridian of the part where high tide exists.

The waters are the highest about three hours after the moon has passed the nadir or zenith of that place, and lowest about the same time after the moon has risen above the horizon on one side, or set below it on the other. Water, like all other resisting media, requires time to move through any given space; hence by a series of successively increasing impulses, the maximum of action does not take place at the instant of the greatest impulse. On the same principle, the highest spring tides are the third tide after new and full moon. The mean interval of two consecutive high tides is 12 hours, 15 minutes.

The tides are less at the solstices than at the equinoxes: as this third power conspires with the centrifugal motion of the earth. When the declinations of the sun and moon are in a line with the equator, the disturbing power is greater: in the quadratures the power is considerably diminished, so that the neap tides at the equinoxes are less than at the solstices.

The effect is greatest when the sun and moon are in the equator, then the earth's motion is increased by two powers, viz. the orbitary power, and that round the centre of gravity, of the earth and moon; and hence the reason why the greatest Spring tides are after the autumnal and before the vernal equinox. When the moon declines from the equator towards either pole, one of the greatest elevations of the water follows the moon. If a place be on the same side of the equator with the moon, the day tide, or that which is produced while the moon is under the horizon of the place, will exceed the night tide, or that which is produced while the moon is above the horizon

the place. This difference will be the greatest when the sun and moon both describe the tropics; thus at Bristol, at this time, the difference between morning and evening tides is 15 inches; and it would be greater, but that a fluid always retains an impressed motion for some time; so that the preceding tides affect always those that follow them.

For the tides to have their full motion, the ocean in which they are produced ought to be extended from east to west 90 degrees at least, because the places where the moon raises most, and most depresses the water, are at that distance from each other. Hence it is only in the great oceans that such tides can be produced, and that in the larger Pacific Ocean they exceed those in the Atlantic Ocean. Hence also it is obvious why the tides are not so great in the Torrid Zone, between Africa and America, where the ocean is narrower, as in the Temperate Zone on either side; and from this also we may understand why the tides are so small in islands that are very far distant from continents. It is manifest, that in the Atlantic Ocean the water cannot rise on one shore, but by descending on the other; so that at the intermediate distant islands, it must continue at about a mean height betwixt its elevation on the one and the other shore.

If a place communicate with two oceans, two tides may arrive at that place in different times, which interfering with each other may produce a great variety of phenomena: thus Sir Isaac Newton notices a remarkable instance at Batsha, a port in the kingdom of Tonquin, in the East Indies, in north latitude near 21 degrees; the day in which the moon passes the equator, the water stagnates there without any motion. As the moon removes from the equator, the water begins to rise and fall once a day, and it is high water at the setting of the moon, and low water at the rising.

This analysis of the general phenomena of the tides accords with the supposition of such being the result of the motion of the earth round the centre of gravity. Variations arise from local circumstances, from the irregularity in the depth of the ocean, the position and declivity of the shores, their situation relative to the neighbouring coasts, the friction of the water against the bottom of the ocean,—all these causes, which it is impossible to reduce to calculation, modify the oscillations of this great fluid mass. Thus in lakes, in confined seas, such as the Mediterranean, where the communication with the ocean is small, they will be very little disturbed by the swell of the ocean. The tides round this island are derivative; and we may consider the tide of the ocean, as it starts from Ushant, divides into two separate undulations; the first, which passes through St. George's Channel, takes 24 hours to go round by the north of Scotland, and come round to Dover; the second passes up the British channel, and reaches Dover in 12 hours. There are many irregularities; at Long Reach, at Spring tide, the motion is not more than two miles per hour, and the ebb is less. Capt. Cook found in New Zealand and New Holland the least tide about $4\frac{1}{2}$ feet, and the Spring tide 16 feet. When in some places the tides never exceed a few feet, whilst at St. Malo and in the Bristol Channel they will exceed 40 feet.

Tides may be considered, with respect to the ocean, as the heart in man. They are the main spring to form the medium of communication between islands and continents, enlivening all the aqueous ramifications, and preserving that general motion so necessary for a large portion of animated nature. By the sea, in its general motion from east to west, the produce of our shores may be conveyed to those of the Americans, and the produce of the East and West Indies be determined to ours; cocoa nuts,

seed of plants, and rushes, peculiar to the West Indies, have thus been transferred to the coasts of Ireland and Scotland. We are unable to contemplate all the advantages to be derived from this astonishing periodical motion of the waters. It is illustrative, amongst innumerable other instances, of that Divine Wisdom which is evinced in every part of the universe, forming a link in that admirable chain by which all parts of creation are connected.

In Plate VI. fig. 6, let X Y represent a portion of the orbit of the earth, described during the period of one lunation. The dotted line, V U, will represent the path of the centre of gravity of the earth and moon during the same period. Then at V, it will be new moon; B, half moon or the quadrature; D, full moon; F, half moon or quadrature; and H, new moon. So that at V, D, H, we shall have spring tides, and B, F, neap tides; as the circumference of any circles are proportionate to their diameter; then N 1, A 2, B 3, &c. will express the value of the centrifugal motion of the earth, during her orbitary progress from new moon to the quadrature. As the impulses are every moment varying, from the constant variation of the centre of gravity, hence N 1, will express too great a proportion for spring tide, as the preceding and subsequent impulses are less and less; whilst the contrary effects will take place at the quadrature; thus B 2, will express a value too little. The diameter, X N, is to the radius B 3, as 12 to 6; as from the above circumstance, 12 will be diminished, and 6 increased: the proportion will not be remote from 11 to 7, which is the proportion of spring tides to neap tides.

I am, Sir, yours, &c.

C. H. WILKINSON.

Bath, February, 1823.

On Linton's Impelling Machine.

IN our last we promised to consider the fallacy of this piece of mechanism, which is called *a new method of impelling machinery, without the aid of steam, water, wind, air or fire*; in other words, a combination of mechanical powers, which as a whole is intended to impel itself, and communicate a rotatory impulse to other machinery. The plausibility of this plan upon a superficial view, has deceived a multitude of ingenious speculators, and upon this ground alone, we plead our apology for laying before our readers, the following demonstration of its impracticability.

Let the diagram, Plate VIII. fig. 3, represent the lower part of the wheel with its arms as described in the specification, page 72. Suppose the diameter of the wheel, xy , to be 5 feet, and the length of the arm, Aa , 3,926 feet, being a quarter of the circumference; the weight of the balls each 10lb. The gravitating power of the eight balls situated as a, b, c, d, e, f, g, h , collectively, must be continually greater than that of the fifteen balls, $j, k, l, m, n, o, p, q, r, s, t, v, u, w, x$, or the wheel could not revolve. Standing as in the diagram, the gravitating power would be on the side of the levers, a, b, c, d, e, f, g, h , but on the ball a , passing to the situation of b , the power diminishes, and becomes inferior to the gravity of the fifteen balls, j, k, l , &c. on the other side.

Assuming the weight of a to be 10lb. (which is situate at the point where it exerts its greatest power) the remaining seven will be according to the sines of their angles (shewn by dots on the line Aa) b , 9.807 lb.— c , 9.238 lb.— d , 8.314 lb.— e , 7.071 lb.— f , 5.555 lb.— g , 3.827 lb.— h , 1.952, making a total of 55.764 lb. which is the maximum gravitating power or weight of the descending

levers. But when the ball *a*, has quitted its situation, and descended nearly to *b*, the other levers descending also through similar arcs, the gravitating power of the whole will be diminished by nearly 10lb.; that is, *a*, will be little more than 9.807; *b*, 9.238; *c*, 8.314, &c. to *h*, which will be nearly at 0.000, making the minimum power or weight of the descending levers 46.764.

In the same manner the gravitating powers of the seven pendant balls, *j, k, l, m, n, o, p*, must be calculated, according to the sines of their angles, shown by dots on the line *x A*, and the eight balls, *q, r, s, t, v, u, w, x*, at the end being whole numbers, will make a total of 125.764lb. on the ascending side.

Now as the shorter arm of the lever *x A*, is 2.500 feet, and the longer arm *A a*, 6.426, the power of the longer arm compared to the shorter arm will be twice, and five tenths, and seven hundredths, which makes the gravitation of the descending balls, *a, b, c, d, e, f, g, h*, equal to 143lbs. at their maximum, and 117lb. at their minimum, opposed to the ascending weight of 125lbs. on the opposite side; or which is the same thing, the increased power of leverage of the descending arms, reduces the value of the fifteen ascending balls to about 48.90lb. Hence the large lever at its maximum, exerting a power of 55.764lb. will have a preponderance of nearly 7lb.; but when at its minimum being only 46.764, will be inferior by 3lb. to the weight to be raised; consequently the lever *a*, will descend by its gravity, to somewhere about the dotted line *A z*, but no farther; for here the opposing weights are balanced; and as the lever cannot get over the point, *δ*, by its own gravity, the whole must necessarily stand still at *x*.

Nobel Inventions.

Perkins's Steam Engine.

THERE has been no invention or discovery in the arts for many years, which has excited so much public attention and speculative opinion as the improvements on steam-engines about to be introduced by Mr. Perkins. We hoped to have been able in our present number to state the results of actual experiment, but the construction and completion of a steam-engine is not the work of a day. To say the truth, we are surprised at the progress made in the short space of a few weeks, being enabled from our own knowledge to state that the engine is nearly in a working condition, and probably before this meets the eye of our readers, will have been actually put in operation.

This engine, constructed to demonstrate the new principle, is intended to exert a power equal to ten horses; its generator (in place of a boiler) holds about eight gallons; the working cylinder is only eighteen inches long. The parts have been proved by hydraulic pressure to bear a force equal to two thousand pounds upon the square inch; a weak part has been subsequently introduced, which shall give way at one thousand pound pressure, the engine being intended to be worked by steam raised to seven hundred.

While we feel indignant at the intemperate squibs which are daily thrown by the ignorant and illiberal against every effort of genius which soars above the grovelling views of the multitude, we are not so sanguine as to expect all that has been contemplated from this surprising invention; certainly the promises are fair, and the anticipations warm among those from whose experience we might derive

confidence ; but the properties of steam are not fully known, and experiment may yet demonstrate the defects of theory ; at all events there is little doubt something has been effected of considerable importance in this branch of science, and we wait with no small degree of anxiety to see the absolute result.

Steam Ships.

It appears that government have at length convinced themselves of the advantages which this mode of navigation affords, as we understand two steam-vessels have been fitted in Deptford Dock-Yard, one of two hundred and thirty-five tons burthen, the other of one hundred and eighty. There are two now building in the same yard, each of two hundred and ninety-six tons burthen, one hundred and twenty-six feet long, and intended to be navigated by steam-engines, each of one hundred horse power. It is in contemplation to employ the power of steam to ships of war.

Calico Printing.

The method of transferring engraved designs from steel plates to copper, as proposed by Messrs. Perkins, Fairman, and Heath, (see our first volume) is now practising with very great success in aid of Calico Printing. By this process very beautiful designs of any character, particularly intricate scroll work, are transferred to the surfaces of copper cylinders, and a description of coloured goods, such as the finest sorts of calico and muslin, are now by these means preparing for the Spring fashions, which, from their extreme delicacy, are expected to take among the upper circles.

Northern Expedition.

While the public anxiety stands on tiptoe-between hope and fear, as to the fate of our hardy countrymen engaged in this adventurous enterprise; and scientific bodies have thought fit to indulge in speculative treatises upon their probable progress, it is gratifying to catch one fibre of the thread which leads to their real situation and welfare. We learn through Russia the gratifying intelligence that Captain Parry and his little fleet were seen last summer by some Kamschatkan whalers above Behring Straits. The situation pointed out upon the map is about 70° north lat. precisely the place where Captain Cook was obstructed in his way northward by a barrier of ice which extended from the shores of America to Asia, consequently our adventurers had effected their object by penetrating through the Arctic sea, or some channel above the American continent, and arrived at the point called by Cook, Ice Cape. This, if true, sets at rest the long disputed question of a north-west passage. We have no reason to doubt this information; but it would be more gratifying to hear it confirmed by official documents. It is probable that if the statement above is correct, no further impediment would prevent their reaching the Pacific Ocean; and in that case we may expect to hear of them through the East Indies very shortly, as it is probable they might reach China or some of our settlements in those seas about November last.

The American government we understand, are about fitting out an expedition for the purpose of exploring the polar seas,—their professed object is commerce; this, however, there can be but little prospect of cultivating to any extent worthy of a nation's attention, and the utmost that can be expected to result from the attempt, is some small acquisitions to our scientific knowledge.

Reviews of New Publications.

A New Century of Inventions, being Designs and Descriptions of One Hundred Machines, relative to the Arts, Manufactures, and Domestic Life; by James White, Civil Engineer, Manchester. 4to. Part I. pp. 86. with 12 plates.

THIS work brings to our remembrance the celebrated production of the Marquis of Worcester, under a similar title. The author of the *New Century of Inventions* has been but little known in the mechanical world: his early essays in science were under the auspices of the late Earl Stanhope; but France, we believe, has been the principal theatre of his mechanical displays.

The production of *ONE HUNDRED original inventions* must be the work of no ordinary genius, and certainly great ability is manifest in the plans here produced; several of them, however, we recognize as old acquaintances; how this arises, we cannot explain. Upon the whole, many valuable designs are here promulgated, which, as mechanical auxiliaries, may be usefully applied to; or combined with, other machinery; and in this view, we recommend the work to the notice of every practical mechanic.

Of the literary merits of this performance little need be said; clearness and perspicuity is all that should be expected. As however, such a work is not designed to adorn the libraries of the great, we cannot avoid observing, that the expensive style in which it is ushered into the world, with large types, small pages, and wide margin, must of necessity exclude it from a great portion of that class, among whom it would be most useful.

The author, in his preface, insinuates, that he was a mechanic from the cradle, and exhibits some of his infantine productions ; as a boat, the sails of which were turned to a side wind by a vane at the mast head, so as to drive it in a given direction across a puddle. A rat-catching apparatus, formed by a walking stick and string, with a noose. A mouse trap, having a spiral passage with baits to attract the animal forward, and flaps to prevent its retreat ; the end being a narrow platform, in turning upon which, he would fall into a vessel of water. Our limits not permitting a description of each article, we shall briefly give the heads of the *Century of Inventions*, as they occur in the work ; the first and second parts only of which are yet published.

1. A Dynamometer, a machine for measuring power and resistance, while in motion.

2. A Barrel Spring, of a new kind, to lengthen the going of clocks, jacks, &c.

3. A Parallel Motion, formed by a combination of ~~the~~ crank with the epicycloid.

4. A System of Concentric Pulleys, commonly called White's Patent Pulleys.

5. A Power Wheel, turned by heated air, gas, or other fluid.

6. An Equable Pump, or machine for raising water without interruption or concussion.

7. A Simple Machine, for protracting the motion of weight-machinery.

8. An Instrument for drawing portions of circles, and finding their centres, by inspection.

9. An inclined Horse-wheel, intended to save room, and gain speed.

10. A differential Combination of Wheels, to count very high numbers, or gain immense power.

11. A Crane, which combines variable powers, with speed and safety.

12. A Direct and Differential Press, with two powers, of which one is immense.

13. A Peristaltic Machine, for raising much water to small heights.

14. A Drayman's Canter, or inclined plane, with increased power.

15. A Perpetual Wedge Machine, being a simple method of gaining power.

16. A Dropping Weight Mover or Machine, for lengthening the time of going of a clock, jack, or other weight machine.

17. A Machine to promote evaporation, with or without heat.

18. A Cutting or Grating Machine, for green roots, tobacco, &c.

19. A Screw, with greatly diminished friction.

20. A simple and powerful Micrometer.

Part II. with 9 Plates.

21. A new system of cog or toothed Wheels, with a treatise upon the forms and positions of teeth; and the theory of generating them.

22. A Cutting Engine, to form sheer or toothed wheels, according to the principle above advanced.

23. A Door Spring, to keep a door strongly closed, yet suffer it to be opened easily.

24. A Draw-bench, for making twisted pinions.

25. A Geering Chain, formed to work in toothed wheels.

26. A Serpentine Boat, composed of many joints, to lessen the expence of traction.

27. A Machine for destroying, or lessening friction.

28. Another machine, to avoid or diminish friction.

29. An Equilibrium Cock, to prevent abrasion and leakage.

30. A Machine to communicate, and suspend motion.

31. A Machine to set on, and suspend, rapid motions.

32. A Machine for forging screws, beads, &c.

33. A differential Steel-yard, to weigh vast weights with short levers.

34. A Retrograph, or machine to write backwards; for engravers.

35. An Eye Machine, for making the eyes of hooks and eyes.

36. A Rotatory Ventilator, acting by pressure.

37. A Combination of Wheels, to raise water.

38. An excentric Bar Press, for squeezing the water from wetted goods.

39. A Colour Mill, for calico printers.

40. A Dynamometer, or second machine, for measuring powers and resistances in motion.

We shall notice the contents of the third and fourth parts of this work, as they come out; which we believe will be in April and July.

Polytechnic and Scientific Intelligence.

Proceedings of the Royal Society.

Dec. 19. A paper on the Chinese year was read by J. F. Davis, Esq. F.R.S. author of a little volume of Tales, translations from the Chinese. It appears that the Chinese had no scientific knowledge of astronomy previous to its introduction in early times by the Arabians, and afterwards by European missionaries. Mr. Davis mentions having seen in an ancient Chinese book, a complete delineation of the system of Ptolemy, with

the earth in the centre; their ignorance of the science having caused them to adopt all the errors of the darkest ages. An illustrative drawing was exhibited with the paper, shewing twenty-eight constellations of which their year consists, with the degrees severally occupied by them. The Chinese have no solar year.

Professor Buckland communicated a paper on rocks that contain magnesia, by C. Daubeny, M. D. Margaret's Professor of Chemistry, Oxford. A part of it was read; after which the Society adjourned over the Christmas vacation.

Jan. 9, 1823. Professor Daubeny's paper was concluded. Mr. Tennant has the merit of first discovering the presence of magnesia in certain lime stones in the north of England; and similar magnesian beds of vast extent have since been discovered to exist in various parts of the continent. It has not been found in the chalk of this country, though it has in France; and Brongniart attributes the sterility and barrenness of the soil in Champagne to its presence in the chalk. Dr. D. remarks that the subject is of considerable importance to building and agriculture, from its effects upon the character of stone in which it is imbedded, and upon vegetation where it exists in the soil. Its presence may be ascertained by the following process. Dissolve the substance to be examined in nitric acid, and evaporate the solution to dryness; then dissolve the substance, which will be lime and magnesia, in acetic acid, and separate these earths by converting them into sulphates. Great care must be taken, however, in thus separating them; too great a heat may drive off part of the acid from the sulphate of magnesia, and so the proportion of magnesia may be underrated, and too little heat may leave some water in the salt, so that the quantity of the magnesia

may be overrated. When the proportion of magnesia is large, a slight effervescence with acids is the best test, and it is generally sufficiently accurate for agricultural purposes.

Lieut. Col. Lambton, F.R.S. read a paper called Corrections applied to the great meridional arc extending from latitude $5^{\circ} 9' 38.39''$, to latitude $18^{\circ} 3' 23.64''$ to reduce it to the parliamentary standard. To reduce this arc to Mr. Bird's standard, which the commissioners of weights and measures have adopted, the measurement of it determined by the brass scale must be multiplied by $\cdot 0000018$, and the product *subtracted*, and that by Ramsden's bar multiplied by $\cdot 000007$, and the product *added* for the correction. Col. L. is proceeding with his arc through Hindostan; he has completed some measurements, and when the requisite calculations are made, will submit the result of them to the Royal Society.

Jan. 16. Sir H. Davy, Bart. P.R.S. communicated some practical observations on the communication and concentration of the magnetic influence, by Mr. J. H. Abraham, of Sheffield. The paper was divided into three parts; the first on the depth to which magnetism penetrates; the second on the communication of the magnetic influence; and the third described some phenomena in polarity. Magnetism does not penetrate above one-twentieth of an inch, and in proportion to the surface, bars of one-tenth of an inch thick are as powerful as those of greater thickness. It extends at once over the whole surface of a body exposed to its influence; each side of an octagonal bar, which was magnetised along only one of its sides, acquiring the same degree of magnetic power. In one respect, however, there is a striking difference between magnetism and electricity:

if a charged Leyden jar comes in contact with one that is not charged, the electric fluid is communicated, and becomes equally divided between the two; but one bar of steel being placed on another, though a single stroke with a set of magnets instantaneously magnetized the whole surface of the uppermost one, yet the lower one did not acquire sufficient power to attract even needle pointings, which are much finer than iron filings; and observing the magnetic action on which, led Mr. Abraham to his invention for obviating the ill effects of dry grinding, for which he received the gold medal of the Society of Arts. He has given several poles to a single bar of steel by the following method: he took a set of magnets, and with them went over a bar from one end to the middle, then turning the set round, went on to the other end, thus leaving off with the same pole he began with. The bar possessed similar poles at the end, and opposite ones in the middle; in this manner even five poles may be given to one bar.

At the same meeting John Macdonald, Esq. F. R. S. commenced the reading of Observations on Magnetism.

Institution of Civil Engineers.

THE first anniversary of this Institution was held on Friday, February 7, at the London Coffee House, when a very numerous and highly respectable meeting of engineers took place, among whom were some of the most distinguished characters connected with the mechanical branches of science. Thomas Telford, Esq. filled the chair; supported by Sir Henry Parnel, M. P., and several other gentlemen of title and distinction, to whom may be added the names of Troughton, Brunel, Donkin, Maudsley, Barton, T. Bramah, F. Bramah, Perkins, Galloway, Collinge, and Cubitt.

In the absence of Arthur Aikin, Esq., honorary secretary, an address was delivered by Mr. H. R. Palmer, in which the views of the Society were developed, (viz.) the concentration of practical knowledge relative to the arts derived from extensive experience; by which the tyro might acquire such valuable information in his profession as the study of theories, and his own individual practice would never enable him to attain. The profession of a civil engineer (said the speaker) differs from all others: it is not comprehended in a definite number of branches, but embraces an incalculable multitude of subjects, a knowledge of which the labour and study of years will but imperfectly supply.

The rise and progress of the Society was then noticed, and the munificence of the gentleman (Mr. Telford) selected to preside over it; who presented the Institution with a valuable library, now deposited at their house, Buckingham Street, Strand. The Society is divided into three classes. Ordinary members, who are practical engineers, reside in and about London; honorary members not engineers, but whose learning and acquirements in the arts collaterally connected with the profession, have rendered them eminent; and corresponding members practical engineers, resident at a distance from London, either in these kingdoms or abroad.

Linnean Society.

Jan. 21, 1823, Major Gen. T. Hardwicke, communicated two papers: descriptive of three insects of Nepaul, and of a tail-less deer, native of the snowy mountains of Nepaul. This animal was presented by the court of Catmāndu to the British Resident, and is now in the menagerie of the Marquess of Hastings at Barrackpore. Its neck is curved like a camel, with a mane on the back;

and though called tail-less, it has the thick part of a tail about four inches long. The following are some of its dimensions. Length of head one foot five inches, neck three feet five inches, body two feet five inches, total length seven feet three inches; height four feet three inches, circumference of the abdomen, four feet nine inches.

Nov. 5. A paper was commenced, entitled, "Remarks on the Identity of certain General Laws which have been lately observed to regulate the natural distribution of Insects and Fungi;" by W. S. Mac Leay, Esq.

Dec. 3. The above paper was concluded; and "A description of some Insects which appear to exemplify Mr. Mac Leay's Doctrine of Affinity and Analogy," by the Rev. W. Kirby, F. R. S. and L. S. was commenced.

Dec. 17. Mr. Kirby concluded his paper, and having read "Some Account of a New Species of *Eulophus*, (Geoffroi)," the Society adjourned to Jan. 21, 1823.

Geological Society.

Nov. 1. A Letter was read from W. C. Trevelyan, Esq. on the Geology of the Ferroe Islands. In Myggenas are some thin veins of coal; in Suderoe, a coal similar to the Scotch, but superior, occurs in abundance, and rises from the level of the sea until it reaches an elevation of 1000 feet. Native copper is very frequent in most of the rocks, generally crystallized, but not abundant; at Famaras and in Suderoe, it occurs in clay ironstone in thin plates.

Royal Geological Society of Cornwall.

Ninth Annual Report.—The progress of this institution since the last anniversary, is stated to be encouraging,

though not equal to the expectations of its friends. The cabinets have been enriched by many valuable donations, and in particular by a splendid series of minerals from Mount Vesuvius, presented by Sir Humphry Davy. The library and funds have also been increased by a liberal donation from J. Hawkins, Esq.

Officers for the present year; President: Davies Gibbert, Esq. M. P. V. P. R. S.—Vice-Presidents: W. Rashleigh, Esq. C. Lemon, Esq. J. Scobell, Esq. J. Paynter, Esq.—Secretary: H. S. Boase, M. D.

Ancient Vessel.

The attention of the curious has lately been drawn to this relic of antiquity, which is now exhibiting in Waterloo-road, Southwark. As to the real age of the vessel, nothing can be said with certainty; but from every appearance it has been buried in the place whence it was excavated near the river Rother, Kent, for many ages. The probability seems to be that a branch of the sea once extended over the spot where the vessel was found, and that at some remote period she foundered there and filled with sand and mud. That the surface of the earth and the boundaries of the sea, have in the course of centuries experienced considerable mutations cannot be doubted; and therefore it is not a matter of surprise, that an ancient arm of the sea should have become dry land, and that under the above circumstances, earth should have accumulated upon and concealed the vessel from observation, until accident presented the most elevated portion of its hull, and led to its ultimate restoration.

The general appearance of the vessel would not strike a casual observer as presenting any thing peculiar, but as an ancient work of art is worthy of consideration.

She is sixty-three feet long, and fifteen broad, flat-bottomed, without a keel, and built with remarkably stout timbers; toward the bow she is shaped something like a Dutch vessel, and intended to carry one mast. There is a cabin in her stern, which, before the roof gave way, might be about six feet high, and the whole length of the vessel appears to have been enclosed by a curved deck rising considerably in the middle, and leaving a gangway along the sides. The iron bolts with which she is fastened are slight for the purpose, and are corroded completely through, having lost nearly half their specific gravity and have no effect on the magnet. The timbers and even planks are remarkably sound, but the whole in colour and appearance resembles logwood after it has been used by the dyer. The windlass at the fore part of the vessel is extremely uncouth in its construction, and appears to be a portion of the trunk of a tree in its rude state, the ends of which, without pivots, are let into holes in the side timbers. The rudder, a part of which remains, is presumed to have been worked by hands, as there is no appearance of a tiller, or the possibility of affixing one, owing to the projecting of the cabin.

The wreck of a small boat was found by the excavators near the vessel, but could only be removed in pieces. There are a great variety of articles exhibited, which were found imbedded in the sand on clearing out the vessel, such as sundry utensils, weapons, and bones of various domestic animals, with some human skulls, legs and ribs, but no entire skeletons. Several earthen jars or pans are preserved, which have apparently been used for culinary purposes; a lock of peculiar construction, but very much corroded, which, from its ring handle and curiously wrought plate, has evidently been the fastening to the lid of a coffer; several keys, or rather

hooks, and a latch; the hilt and part of a broken blade of a sword, probably an ancient *Seaxe*; a circular board pierced with many holes, supposed to have been employed to keep reckonings; several leather sandals of a curious form with thongs for fastening them; some ornamented bricks and pieces of tiles, which appear to have formed the fire hearth.

On the outside of the vessel there are two small plates apparently cast in pewter, on which are distinctly raised the old English letters (p l.) The general opinion as to the origin of this vessel is, that she belonged to one of the Danish expeditions which made inroads upon the shores of England about the time of King Alfred, and this opinion is strengthened not only by the situation in which she was discovered, but also by the articles found on board, which certainly correspond with that age; or indeed, it may have been a Saxon vessel, of a date still more remote, belonging to *Hengist* and *Horsa* the first Saxon landers, who landed on that part of our island.

Lightning Conductors among the Ancients.

One of the Greek historians contains a curious anticipation of the modern invention of iron conductors for the tops of large buildings, so strikingly applicable, as to fix the imputation of the grossest plagiarism on Dr. Franklin, if the world were not fully convinced of the entire originality of that able philosopher's discoveries. Ctesias relates that in India is a peculiar sort of iron, which possesses the quality of *averting storms, and drawing down fire from the heavens.*

Patents Sealed in 1823.

To James Neville, of New Walk, Shad Thames, Surry, civil engineer, for an improved method of producing and applying heat to, and constructing and erecting furnaces and other reservoirs, severally used for the various purposes of roasting or smelting metallic ores, or other substances, melting metals or any other matter, and for heating pans or boilers or other substances usually contained in pans or boilers, in the various operations of producing steam, distilling, brewing, dyeing, boiling or baking sugar, boiling soap, or any other manipulation or operation, in which the application of heat is necessary ; and also for the purpose of producing, and applying heat to furnaces, pans, boilers and reservoirs already erected and used, or to be used for the purposes above mentioned ; and likewise for effecting a saving in fuel, and producing a more complete combustion of smoke, than at present takes place ; as well as a better mode than any now in use, of collecting and preserving any volatile substance contained in, or combined with, metallic ores, or other substances, in the separation of which heat is necessary ; and for the purpose of applying heat to the operations of baking or drying substances in kilns, floors or racks, or in ovens.—Sealed, 8th January, 1823.—6 months for enrolment.

To Nathaniel Partridge, of Bow Bridge, near Stroud, in the county of Gloucester, Dyer, for an improvement in the setting or fixing steam-boilers or other coppers, and of communicating heat to boilers or coppers, by which a considerable saving of fuel will be effected ; and the smoke more effectually consumed.—Sealed 14th February.—6 months for enrolment.

To Francis Deakin, of Birmingham, in the county of Warwick, sword-maker, for an improvement to pianofortes, and other stringed instruments.—Sealed, 18th February.—6 months for enrolment.

To Thomas Fuller, of Bath, in the county of Somerset, coach-builder, for an improvement in the construction of shafts, and the mode of attaching them to two-wheeled carriages.—Sealed, 18th February.—2 months for enrolment.

To Thomas Bury, of Salford, Manchester, in the County Palatine of Lancaster, dyer, for an improvement in dying, or producing a permanent nankeen colour, on cotton wool, skein yarn, and certain other articles.—Sealed 18th February.—2 months for enrolment.

To William Church, of Nelson Square, in the county of Surry, gentleman, for an improved apparatus for printing, to be used by type, block, or plate printers.—Sealed 18th February.—6 months for enrolment.

To Augustus Applegath, of Duke Street, Stamford Street, Blackfriars, in the county of Surry, Printer, for certain improvements in printing machines.—Sealed, 18th February.—6 months for enrolment.

* To Philip Chell, of Erle's Court, Kensington, in the county of Middlesex, engineer; for certain improvements on machinery for drawing, roving and spinning hemp, flax, and waste silk.—Sealed, 18th February.—6 months for enrolment.

D. H. M. S.		D. H. M. S.	
3 6 32 4	♂'s 2nd Sat. eclipsed.	15 15 24 0	♂ in conj. with ♀.
3 9 7 18	♂'s 2nd Sat. will emerge from its shadow.		long. 1 ^h 7 ^m 8'. Dif. dec. 6 ^o 47' ♀ 18 43' N, ♀ 11 ^o 56' N.
3 18 39 0	♂ in conj. with α m. long. 8 ^h 7 ^m 5'. Dif. dec. 9' ♀ 25 ^o 53' S. α m 26 ^o 2' S.	16 0 0 0	♂ at his greatest elongation.
4 0 0 0	♂ stat. long 10 ^h 21 ^m 7'.	17 8 10 6	♂'s 3rd Sat. will emerge from its shadow.
4 7 0 0	♂ in quadrature entering the last quarter.	17 8 24 0	♂ in conj. with ♀. long. 2 ^h 1 ^m 7'. Dif. dec. 5 ^o 1' ♀ 24 ^o 53' N. ♀ 19 ^o 52' N.
4 10 17 48	♂'s 1st Sat. will emerge from its shadow.	19 6 26 0	♂ First quarter.
5 0 0 0	♂ in Apogee.	20 0 0 0	♂ in Perigee.
6 14 41 0	♂ in conj. with ♀ long. 9 ^h 11 ^m 1' Dif. dec. 1 ^o 51' ♀ 25 ^o 11' S. ♀ 23 ^o 20' S.	20 8 38 25	♂'s 1st Sat. will emerge from its shadow.
10 1 50 0	♂ in conj. with ♀. long. 10 ^h 23 ^m 11'. Dif. dec. 1 ^o 12' ♀ 12 ^o 22' S. ♀ 13 ^o 34' S.	20 21 57 0	♂ enters ♄.
10 9 7 56	♂'s 2nd Sat. eclipsed.	22 0 0 0	♂ in Aphelion.
12 6 44 0	Ecliptic Conjunction or ● New Moon.	24 9 44 7	♂'s 3rd Sat. eclipsed.
12 11 55 7	♂ in conj. with ♀ long. 11 ^h 24 ^m 25'. Dif. dec. 4 ^o 31' ♀ 1 ^o 19' N. ♀ 3 ^o 12' S.	24 22 7 0	♂ in conj. with ♀ long. 0 ^h 4 ^m 1' Dif. dec. 40' ♀ 1 ^o 34' N. ♀ 54' N.
13 20 10 0	♂ in conj. with ♀ long. 0 ^h 12 ^m 23'. Dif. dec. 5 ^o 33' ♀ 9 ^o 13' N. ♀ 3 ^o 40' N.	26 5 47 0	Ecliptic opposition ☉ Full moon.
		27 10 34 13	♂'s 1st Sat. will emerge from its shadow.
		31 3 1 0	♂ in conj. with α m long. 8 ^h 7 ^m 19'. Dif. dec. 19' ♀ 25 ^o 43' S. α m 26 ^o 2' S.

N.B. All the above calculations are made to mean or clock time.
The waxing moon ♀—the waning moon ☾.

METEOROLOGICAL JOURNAL.

1823.	Thermo.		Barometer.		Rain in inches.	1823.	Thermo.		Barometer.		Rain in inches.
	Higt.	Low.	+	-			Higt.	Low.	+	-	
JAN.						FEB.					
25	27 ^o	21 ^o	.	—,13	..	9	43 ^o	32 ^o	+,10	—,10	..
26	30	20	+,07	.	..	10	44	35	+,06	—,11	,175
27	34	25	.	—,16	..	11	49	33	.	—,05	,275
28	43	30	.	—,01	..	12	46	35	.	—,12	,075
29	48	40	+,10	—,02	,5	13	43	32	+,06	—,07	..
30	47	37	+,09	.	..	14	43	36	+,18	.	,175
31	43	36	.	—,18	,025	15	38	31	+,29	.	..
FEB.						16	39	31½	+,13	.	,15
1	45	36	.	—,18	,075	17	36	31	.	—,13	..
2	41	33	+,07	.	,225	18	40	31	.	—,34	..
3	40	37	+,11	.	,05	19	44	31	+,42	.	,35
4	39	30	+,09	.	,25	20	42	29	+,15	.	..
5	33	27	+,17	.	..	21	50	31	+,02	—,13	..
6	31	29	.	—,10	..	22	46	36	+,09	—,06	,2
7	41	29	+,01	—,19	..	23	46	34	.	—,30	,125
8	38	29	+,17	.	,6	24	49	39	+,30	.	..

Lower Edmonton.

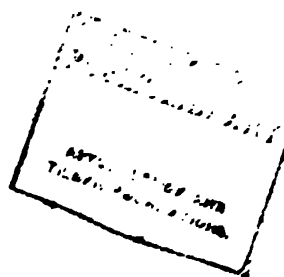
C. H. ADAMS.

LITERARY NOTICES, &c.

The Society of Arts have just published the fortieth volume of their Transactions, illustrated by twenty-four plates. The papers contained in this volume are as follows:—In the class of agriculture and rural economy. On reclaiming fifty acres of waste moor land, by J. Peart, Esq.; on the cultivation of the white poppy upon four acres of ground, and extracting sixty pounds of solid opium therefrom, equal to the best Turkey opium, by Messrs. Cowley and Stains; on preserving the roots of turnips in a fit state for feeding cattle during the months of February, March, and April, by the same gentlemen; on a method of boring hay-stacks for the purpose of ventilation, by Mr. Arthur Biddle. In Polite Arts.—On Mezzotinto engraving on soft steel, by Mr. Lupton. In Chemistry and Mineralogy.—On a process for glazing common earthenware goods by the employment of a material not injurious to the health of the workmen, by J. Meigh, Esq.; on the mode of preparing the stones used in Tuscany, for grinding fine flour, by H. Revely, Esq. In Mechanics.—On a newly constructed cast-iron gun carriage, by R. Pering, Esq.; on a life beacon, by G. Holditch, Esq.; on an improved bridle-bit, by Mr. C. Goodwin; on an improved bistoury, by Mr. J. Millikin; on an improved ships' compass, by Lieut. R. P. Littlewort, R. N.; on a mode of converting a ships' boat into a life-boat, by Capt. H. Gordon, R. N.; on a system of musical notation for the use of the blind, by Mr. J. Watson; on self-acting hydraulic apparatus for regulating the supply of water to mills, by Mr. Thom; on an hydraulic apparatus for producing the movements of an orrery, by Mr. O. A. Busby; on an improved hammer for

turret clocks, by Mr. W. Wynn; on a regulating screw for the main spring of a musket, or other fire-arms, by Mr. E. Baker; on a caisson or coffer for repairing ships afloat, by Mr. Hookey; on a self-acting apparatus for supplying a steam-boiler with water, by Mr. T. Hall; on a mode of intercepting the small particles of metal thrown off in pointing needles, and other dry grinding, by Mr. J. H. Abraham; on a detached escapement, by Mr. G. Savage; on a rat-trap, by Mr. S. Bowler; on an instrument for marking a ships' place upon a chart, by Mr. E. Wigzell; on a scale for the correction of temperature, as applied to the hydrometer, by Mr. A. Ainger; on an improved mode of opening and shutting church windows for the purpose of ventilation, by Mr. W. Bailey. In Manufactures, Colonies, and Trade.—On improved blocks for calico-printers, by Mr. S. Marshall; on an improved weavers' drawboy, by Mr. S. Richards and Mr. Hughes; on a ribbon-loom, by Mr. Thompson; on a new material for the manufacture of straw plat, by Mrs. Wells; on making Leghorn plat from straw imported from Italy, by Mr. Parry; on broad cloth made entirely of wool from New South Wales, by Mr. Starkey; on a new material for manufacturing hats, by Mr. Pritchard; on several samples of wool from New South Wales, by J. M'Arthur, Esq.; on the same subject, from J. Raine, Esq.

An Appendix is added to the volume, containing the representation and description of various articles adapted to supply the place of a lost hand, by G. W. De Renzy, Esq.; and an Analytical Index to the subjects contained in the Transactions of the Society, from Vol. 26 to 40, inclusive.



THE
London
JOURNAL OF ARTS AND SCIENCES.

No. XXVIII.

Recent Patents.

To JULIUS GRIFFITH, of Brompton Crescent, in the County of Middlesex, Esquire; for certain Improvements in Steam Carriages; and which Steam Carriages are capable of transporting Merchandise of all kinds, as well as Passengers, upon Common Roads without the aid of Horses; being communications by Foreigners, and discoveries by himself.

[Sealed, December 20, 1821.]

THESE improvements consist in a certain combination of mechanical powers and agents connected to a wheeled carriage, which are to be actuated by the force of steam, for the purpose of impelling the carriage forward upon an ordinary road. The general appearance of this carriage is shewn in Plate IX. The engines (of which there are to be two, the alternating actions of the

pistons precluding the necessity of a fly-wheel) with their furnace, boiler, condenser and other appendages, are to be placed at the hinder part; but the cylinders are not seen in the figure of the carriage as represented, being enclosed in a box between the hind wheels.

The carriage consists of a body of any desirable shape, capable of holding travellers or merchandise, which, if necessary, may be supported upon springs attached to the main perch. The carriage is enabled to turn or move in a circuitous track, by shifting the position of the fore wheels, which alters their direction. The short axles or pivots of these wheels are supported in vertical frames, or yokes, *a*, which turn horizontally on spindles or shafts passing through them, and through the cross-bar above. The positions of these fore-wheels are changed by means of the handles and shaft, *b*, worked by the person in front, who directs the course of the carriage.

When the handle and shaft, *b*, is turned either to the right or left, a pinion at its lower end taking into the large bevelled-wheel, *c*, toothed internally, will cause it to turn, and move the levers, *d d*, attached to its shaft. These levers are connected to arms, *e e*, which extend from the yokes near the outer pivots of each fore-wheel, and by the action of the shaft and levers, *d*, the wheels are turned horizontally upon those parts of their peripheries which are in contact with the ground. Thus the fore-wheels may be placed in positions oblique to the direction of the hind-wheels, and by that means, the carriage as it advances will perform a curve, or turn round an angle in the road.

The yokes which carry the fore-wheels are not connected to the main perch of the carriage, but to a short revolving perch, *f*. This perch is embraced at each end by an iron hoop, the one being affixed to the main perch,

the other to the framing of the yokes, by which means as the fore-wheels pass over inequalities in the road, the carriage oscillates upon the revolving perch, and preserves its erect position. The steam-engine and its appendages are also prevented from partaking of the reeling motion of the carriage, by standing on a swinging platform, which is suspended on slings from the iron frame, *g*; and the four chains which support this platform are rendered elastic by means of helical springs, *h*. The hind-wheels are connected to the main perch by means of forked shafts, *i*, on the under side of which staples are attached, holding the pivots or short axles of these wheels.

The fire-place, *k*, may be of iron lined with fire-brick, and is supplied with fuel from the box, *l*, as occasion may require, by the attendant behind, *m*, being the handles for opening the feeding door, and register for adjusting the draft of the furnace; and below is the ash-pit and stoke-hole. The boiler is formed by several series of metal pipes, *n n*, which double and return across the furnace, and in these pipes the steam is intended to be generated.—*o*, is a reservoir of water which flows through a ball and socket joint to the pipe, *p*, for the supply of the boiler. An injecting pump, *q*, forces the water into the lower tube, *r*, which from thence flows into the lower range of pipes, *n n*, and the steam there produced, by the action of the fire upon their external surfaces, rises through the upper ranges of pipes, and in its progress receives an increase of temperature, which augments its elastic force, until it discharges itself through the upper pipe, *s*, to the cylinders of the engines.

The condensers consist of a number of flat tubes, doubled, which pass up and down in the box, *t*, and their external surfaces being exposed to the action of the at-

mosphere, causes the steam therein to be condensed; after which, the water runs off into the reservoir, *o*. Thus the heat of the furnace at *k*, converts the water contained in the pipes, *n n*, into steam, which after passing through the whole range in the boiler, proceeds by a bent pipe some distance up the chimney, *v*, and thence to the induction apertures. The steam on being admitted into the cylinder, exerts its expansive force, and raises the pistons alternately; and on the opening of the eduction valve by the ordinary modes, the steam contained in each cylinder is allowed to pass into the condensing tubes, by which means, with the assistance of slides, &c. as usual, opening and closing the respective valves, the steam-engine is kept in action.

The power of the engine is communicated to the hind-wheels of the carriage, by means of sweep-rods, *u*, connected to the piston-rods; at the lower parts of each sweep-rod there are driving pinions with detants, which take into the toothed-wheels, *w*; these toothed-wheels being affixed to the ordinary wheels of the carriage, will, when impelled round by the driving pinions and detants, carry the ordinary wheels round with them, and hence by the friction of their peripheries against the ground, the wheels in revolving impel the carriage forward.

The mechanism connected to the lower part of each sweep-rod, *u*, and to its driving pinions, is called an ARTZBERGER, from its inventor, Professor John Artzberger, of Vienna. It consists of a fork and axle, forming a sort of universal joint, which accommodates the connection of the driving pinions and detant to the toothed-wheels, and keeps them in geer, notwithstanding that the engine is subject to a swinging motion, and the wheels to jolt upon an uneven road. The detant is held by a spring in

the artzberger, which causes it to act in the teeth of the wheels; but as the wheels may sometimes pass more rapidly than the pinions, there is a provision in the detant, allowing the wheels to run before or escape past it; and the detant is capable of being shifted so as to impel the carriage backward as well as forward. This part of the machinery does not appear to be very clearly explained.

The specification concludes by saying, "I do not intend hereby to claim as my invention, any of the parts of this machine which may have been in use heretofore; but I do hereby claim the suspension of the steam-engine boiler and engines upon springs, and the mode of communicating motion therefrom to the carriage wheels by the mediation of the artzbergers, so that neither the turning of the carriage wheels independantly of the steam-engine, nor their balancing movement upon the springs, can prove injurious to the mechanism. Neither do I mean or intend hereby to limit myself to the employment of two steam-engines, or four carriage wheels only, considering every kind of modification which may appear to me necessary in my endeavours to bring my steam-carriages nearer to perfection, as being under the protection of my patent."

Inrolled, June, 1822.

It would have been gratifying to us in giving the above description of an apparatus possessing considerable ingenuity, to have been able to add some experimental observations as to its operation and applicability to public use; but as the machinery is still undergoing considerable alterations and variations in its detail, we can only promise to take up the subject when the carriage shall be actually in operation.

To GEORGE STRATTON, of Hampstead Road, in the County of Middlesex, Engineer, for his Invention of an Improved Process of Consuming Smoke.

[Sealed 2d March, 1822.]

THIS invention is a particular mode of supplying fuel to the furnace of a steam-boiler, which is intended to consume its own smoke, by preventing its escape in any direction, except by passing through the body of the fire which generated it, and by that means effecting its complete combustion.

Plate X. fig. 2, is a vertical section of a boiler and furnace upon the improved plan, taken lengthways; *a a a*, are parts of the boiler occupied with water; *b, c*, are two fires under the same; *d d d* are parts of the flues which pass entirely round the boiler to the chimney, *e*. The fuel is supplied to the fire, *b*, through the pipe, *f*, and to the fire, *c*, through the pipe, *g*, both of which are surrounded by the water of the boiler, to prevent the metal of which they are formed from melting or burning. These pipes or passages for the fuel are of a conical form, the widest part being at the lower end; and after the coal is introduced, their tops are to be closed by metal caps fitting nearly air-tight: or hoppers may be employed, attached to the tops of the pipes, as shown by dots, and furnished with feeding-valves or sliders.

The fire is first to be kindled on the bars at *b*, and fuel dropped upon it, until the whole of the feeding-pipe, *f*, is filled, and then the upper end must be closed by the cap or cover. The fuel at *b* will be soon red hot, but as the top of the pipe admits no vent, the smoke can only pass through the red hot part of the fire, by which means it becomes completely consumed. The effect and operation

Stratton's Improved Process of Consuming Smoke. 175

of the feeding-pipe, *g*, which supplies the front grate, *c*, will be exactly similar to that at *f*; but the fuel may be occasionally furnished to this front grate by a door in the ordinary way, and the smoke there generated will, by passing through the fire at *b*, become completely consumed.

This contrivance may be adapted to other furnaces besides those employed for heating the boilers of steam engines, and instead of the feeding-pipe passing through the boiler, it may be surrounded by a reservoir of water provided for the purpose. The Patentee states, "My said apparatus may vary in its dimensions and proportions to suit the situations to which it is to be applied; but an apparatus applicable to fires, which causes the smoke from fires to be consumed by preventing its escape from the fuel in any direction, except through the immediate body of the fire which generates it, thereby exposing it to such an intense heat as will consume it, and capable of being added or attached externally to almost any part of any shaped boiler, being, to the best of my knowledge and belief, entirely new, and never before adopted for that purpose in this kingdom, I intend hereby to maintain an exclusive right and privilege to my said Invention."

Inrolled, August, 1822.

To ROBERT VAZIE, of Chasewater Mine, in the Parish of Kenwyn, in the County of Cornwall, Civil Engineer, for an Improvement in the Compounding of different Species of Metals.

[Sealed September 3, 1822.]

THIS operation is to be performed, first by the introduction of any quantity of cast iron into a reverberating

or blast furnace, and there, by means of heat, rendered fluid; a quantity of brass is then to be added to the iron, and the whole stirred until the mass of the two metals shall be completely mixed; and as soon as the ebullition has subsided, the compounding of the metals (as far as regards this part of the process) is considered to be complete, it then being in a fit state for casting into any forms that may be required.

Secondly,—If a portion only of the iron is to be alloyed, the brass must be melted first, and then mixed in a ladle or other convenient receptacle, or the metals, after being melted, may be mixed in the moulds, when the articles are to be cast, by carefully stirring them together.

Thirdly,—The fluid iron may be drawn into a ladle or other vessel, and the brass in a solid state introduced in small pieces, and with care, observing the mass must be continually stirred until the brass is completely melted and mixed with the fluid iron.

Fourthly,—The solid brass may be put into a ladle or other receptacle, and fluid iron poured upon it, observing that the mass be stirred until the whole of the brass is melted and properly combined with the iron; the preference however is given to that method of mixing the two metals, as described under the second head.

The proportionate quantities of the brass which may be added to the iron must vary according to the nature of the article for which the compound metal is intended to be employed; for pumps to be used in mines, where the water is of a corrosive quality, the proportions may be one part brass to one hundred parts of iron, which has been found by experiment to improve the metal, and to withstand the corrosive action of the mineral waters; but for cylinders of steam-engines, working barrels of ordinary pumps, boxes of carriage wheels, the bearings

of axles, pivots of cog-wheels, and other articles subject to considerable friction, the proportions of the two metals may be varied more or less, according to circumstances; and this admixture or alloy of iron is found to be much stronger than either of the metals alone, by mutually insinuating their particles into the pores of each other, and thereby producing a more intimate cohesion of the whole.

Inrolled, January, 1823.

We are favoured by the following remarks from the Patentee:—

“ In the specification, I have thought it my duty accurately to describe the process by which the compound is formed, but I have been under the necessity of taking latitude in the proportions of the different metals to each other, occasioned by the different uses to which it may be applied, and for the following reasons:—

“ A part of the bearing brasses in the Chasewater Mine engines sustains a moving power of twenty-eight tons, while other of the bearers have not to sustain a pressure of so many pounds weight, and as the iron alone is much more subject to cut the axles than brass, it naturally follows, that the proportion of metals must depend upon the load to be sustained; but, in all cases, I have hitherto experienced the compound metal of brass and iron is superior to either brass or iron alone. During the course of my experiments I have attempted the compounding of almost every other metal with iron, and have found some of those nearly impracticable, and others defective. The great facility, however, with which the compound I have specified is effected, cannot fail to accelerate the general introduction of the improvement.

“ It may with propriety be observed, that a very small proportion of brass, put gently into the furnace before

the cast-iron is drawn out, has a powerful effect in reducing the scoria, and by rendering the metal more fluid, facilitate the casting, for whatever uses it may be intended. I beg leave further to observe, that it is my intention to allow any founder the liberty of employing the improvement, upon moderate terms, who may apply for the same; I shall therefore consider myself obliged by your giving the invention a place in your valuable publication.

"I am, Sir, yours, &c.

"ROBERT VAZIE."

To DAVID REDMUND, of *Agnes Circus, Old-Street Road, in the County of Middlesex, Engineer, for certain Improvements in the Construction or Manufacture of Hinges for Doors.*

THESE improved hinges are intended to answer the purpose of spring-hinges, by closing the door to which they are attached, when it is opened to any angle short of a right angle; but beyond that they act only as common hinges, without any impelling power, and enable the door to be set wide open. This contrivance, shewn in Plate X, is a rising hinge, the wings of which are respectively united to the upper and lower cylindrical parts, *a* and *b*; a spindle, *c*, is cast in, or otherwise affixed to the lower cylindrical piece, *b*, and the upper cylindrical piece, *a*, being hollow, turns upon this spindle, *c*. The hinge is shewn sideways at fig. 3, and closed. The junctions of the upper and lower cylindrical pieces are double inclined planes, seen at fig. 4, which represents the back of the hinge. In opening the hinge, the planes work against each other, as seen at fig. 5, and if left in that situation, the inclinations of the planes are such, that the

weight of the door would cause the hinge to close with considerable force. If, however, the hinge be opened beyond a right angle, as at fig. 6, the inclined planes will be no longer in contact, but the flat parts at the junctions of the cylinders will rest upon corresponding flat ledges. The hinge will then have no tendency to fall or close, and the door will stand wide open.

These hinges are to be attached to the door in the same manner as ordinary rising-hinges, that is, the wing which belongs to the upper cylindrical part is to be affixed to the edge of the door, and the wing which belongs to the lower cylindrical part to the door-jamb. A thin plate of metal may be bound round the middle part of the cylinder, and work with it, for the purpose of covering and concealing the joint. As cases may occur where the door is not sufficiently heavy to close the hinges with force, a helical-spring may be introduced within the cylinder, coiling round the spindle, for the purpose of pulling the hinge together powerfully. When hinges of this improved construction are required for doors that open both ways, the inclined planes must be formed without the perpendicular stops; that is, the junctions of the cylindrical parts of the hinge must be shaped as double wedges, the points of the upper part acting in the recesses of the lower, and vice versa.

The patentee observes, "It may be necessary to state that my improvement on hinges consists in the application of the principle of the two inclined planes (with or without the tube or springs,) to all sorts of hinges for doors, &c., where they may be found useful. Nor do I in any way confine myself to the dimensions of the parts, or to any particular form of hinge."

To RICHARD WRIGHT, of Mount Row, Kent Road, Surrey, Engineer, for his Invention of certain Improvements in the Process of Distillation.

[Sealed 9th November, 1821.]

THESE improvements will be seen by reference to Plate X, fig. 1, which is a section of the still and refrigerator, with the pipes thereto connected. The still is made of metal as usual, but having one internal division, *a a*, which forms the still into two compartments; these are both charged with wash or other liquor intended for distillation. The still being heated by the furnace below, the vapour from the lower compartment will be driven through the tube, *b*, and descend by the bent pipes, *c c*, into the wash of the upper compartment; or from the tube, *b*, without the bent pipe, the vapour may be dispersed above the surface of the liquor within the still, by the intervention of a plate placed over the tube; or the vapour may be carried from the tube, *b*, by a pipe, *d*, up to the vessel of water, and descend again by the pipe, *e*, into the upper compartment of the still; by which means a partial condensation will have been effected of the grosser vapours which have arisen from the lower compartments of the still, and the lighter or uncondensed vapour will pass off through the perpendicular pipe, *f*, to the condensing apparatus, where it finally becomes spirit. The heat of the furnace being continued, the vapour from the upper compartment of the still will also be driven off and pass through the pipe, *f*, to the condensing apparatus. A small pipe, *g*, with a stop-cock, is inserted into the tube, *b*, and carried through the vessel of water, by which a small quantity of the vapour from the lower

Atlatons Furnace.

Atlatons Expanding Frames.

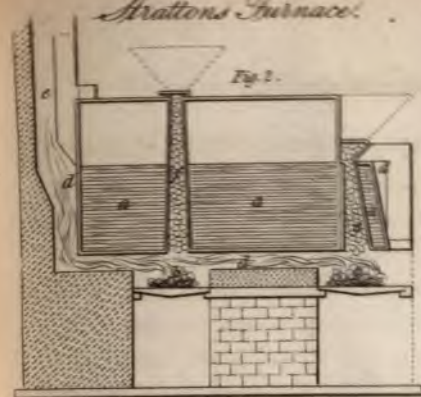


Fig. 7.

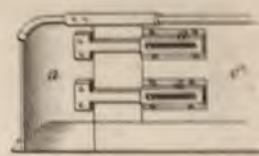


Fig. 8.

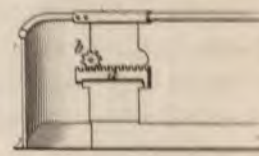


Fig. 9.

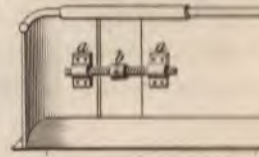


Fig. 10.

Redmunds Hinges.



Fig. 3.



Fig. 4.

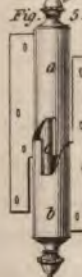


Fig. 5.



Fig. 6.

Wrights Improved Still.

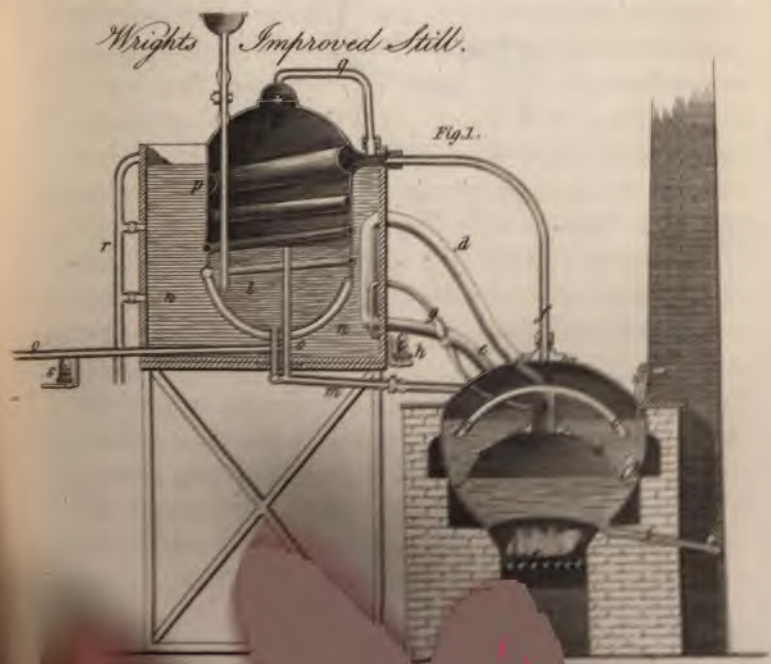
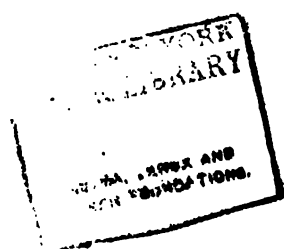


Fig. 1.



part of the still may be admitted into the glass vessel, *h*, for the purpose of ascertaining the quality of the vapour.

When the spirit is out of the lower compartment of the still, and the spirit of the upper compartment reduced to the gravity it is intended to be wrought to, the spent liquor below is to be drawn off through the cock, *i*, after which the valve, *k*, may be opened for the purpose of admitting the liquor from the upper to the lower part of the still; and the succeeding charge is drawn from the cistern, *l*, through the pipe, *m*, to the upper part of the still. The claims of the patentee, as to originality in this part of the apparatus, are stated to be "a still capable of discharging wash or other liquor entirely exhausted of spirit; and at the same time retaining the *faints* in the upper compartment, to embody in the succeeding charge from the condenser."

The condensing apparatus consists of two cisterns placed one within the other; the inner one, *l*, should be made of copper, and is filled with wash or other liquor intended for subsequent distillation, by means of the pipe and funnel, *j*. This vessel should be of sufficient capacity to contain at least two charges for the upper compartment of the still. The outer vessel, *n n*, may be made of wood, and must be charged with water circumscribing the inner vessel. When the inner vessel is attached to other stills, the outer vessel, *n n*, is proposed to be dispensed with; and the pipe, *o o*, attached, which must communicate with another condenser.

The vapour passing from the still through the pipe, *f*, as above described, proceeds to the spiral condensing pipe, *p p*, shewn in section, which passes several times round the vessel, *l*, and the vapour being cooled and condensed in its progress, finally collects in the form of spirit, and is drawn off through the pipe, *o*; *q* is a pipe inserted

into the head of the vessel, *l*, with a light valve opening upwards for the purpose of admitting any vapour into the condenser, *p*, which might arise from the vessel, *l*, but at the same time preventing the passage of any from the still through the pipe, *f*. A waste pipe, *r*, is attached to the cistern, *n*, in order to carry off the surplus water.

The parts of the latter apparatus claimed as original are "a vessel to contain wash or other liquor in progress of distilling, surrounded by a cavity for condensing the vapour from the still." And the apparatus shewn at *h* and *s*, which are glass vessels containing "a number of graduated bubbles of known gravity, which being put into a glass vessel into which a portion of the spirit passes from the still, according to the number of bubbles afloat, their colour, or shape, the levity of the spirit is denoted; and with the assistance of a thermometer the strength is ascertained. The graduated bubble being well known, it is not necessary for me to describe it, neither do I claim its invention."

Inrolled, May, 1822.

To HENRY IBBOTSON, of Sheffield; in the County of York, Fender Manufacturer, for an Invention of a Fender capable of being Extended or Contracted in Length, so as to fit Fire-Places of different Dimensions.

[Sealed 28th November, 1822.]

THESE fenders are made to extend or contract, by being formed of pieces which slide in a lateral direction, and by that means elongate or shorten the front, as may be desired. The patentee describes his contrivance as

effected in four ways, but these variations only refer to the modes by which the parts are connected and moved. The front of the fender is to be made in the usual manner, without attaching any bottom plate to it, and is then to be cut perpendicularly across in two places, at about six inches from the curved ends, by which the fender will be divided into three pieces, the middle piece being straight and the two end pieces curved. These pieces are to be put together, according to the first plan, by affixing corresponding sockets to each piece, and connecting them by horizontal screw-bolts, as shewn at Plate X, fig. 7; *a a* are the sockets, *b* the screw-bolt, *c c* the pieces of the fender, and *d* the space or distance which the one end of the fender has been extended from the middle piece. These spaces are covered in front, or on the outside of the fender, by pannels, pillars, tablets, or any other ornamental pieces, which are attached to the ends, and by that means, when seen in front, the junction of the sliding parts are not visible. The second mode of attachment is by means of sockets placed on the middle piece, as at *a a*, fig. 8, and by square bolts affixed to the end pieces, which slide in and out, and by that means extend or contract the fender. The third method is by a rack affixed to the middle piece, as at *a*, fig. 9, and a pinion, *b*, connected to the end piece; the turning of this pinion either to the right or left, by means of a key, will cause the end piece to advance toward or recede from the centre piece. The fourth mode of connecting the parts together, and causing them to slide, is by means of a double screw with a right and left handed thread; *a a*, fig. 10, are the sockets attached to the middle and end pieces, which as the screws, *b*, revolve, cause the parts of the fender to extend, or contract.

The bottom plate of the fender is to be cut asunder in

the same manner as the front, and connected by sliding bolts and sockets. Stops are put at the joints to prevent the pieces from coming apart, and the length of the slides, sockets, and spaces, will be varied according to the size of the fender. When the fender is to be raised on balls or feet, the middle part of the bottom plate is sloped, and the parts of the plate are fastened by screws to the moulding of the corresponding pieces of the front in the usual manner.

Inrolled, January, 1823.

To JOHN PEARSE, of Tavistock, in the County of Devon, Ironmonger, and Clock and Watch-maker, for an Invention of certain Improvements in the Construction and Manufacture of Spring Jacks, and their Connection with Roasting Apparatus.

[Sealed 29th July, 1822.]

THESE improvements consist, first in combining a train of toothed wheels with a spring barrel, so as to produce a regular and continued rotatory motion without the employment of a fuzee or chain; and secondly, in a mode of connecting the mechanism to a roasting-spit, and thereby causing it to revolve. The spring jack is contained in a box which is affixed to the side of the roasting-screen. The internal construction of the jack is similar to those pieces of clock-work called French movements, where the impelling power is given by a convolute spring in a revolving barrel; upon the periphery of which barrel there is a toothed rim connected to a train of toothed-wheels and pinions, one of which works into an endless screw, and upon the axle of this

Congreve's, for multiplying Fac-simile Impressions. 185

endless screw is an horizontal fly-wheel, for the purpose of regulating the going of the mechanism.

The spit intended to carry the meat turns upon bearings in the ends of the screen, and a toothed-wheel of about five inches diameter is affixed to the end of the spit, which receives its rotatory impulse from a toothed-wheel above, connected by means of a pinion upon its axle to the action of the spring-barrel.

"This improved spring jack is very small compared to its power, is simple in its construction, and is perfectly capable, when wound up, of turning a joint of meat weighing twenty-five pounds, and of continuing to go from thirty to forty minutes without requiring to be attended to."

The patentee claims as his invention, the combination and appropriation of the train of wheels actuated by a spring without a fusee, for the purpose of a roasting jack; and the mode of connecting the spit to the train by means of a toothed-wheel.

Inrolled, January, 1823.

To SIR WILLIAM CONGREVE, of Cecil Street, Strand, Middlesex, Bart. for his Invention of certain Improved Methods of multiplying Fac-simile Impressions to any extent.

[Sealed, 29th January, 1822.]

THE first method of multiplying fac-simile impressions herein proposed, applies principally to letter-press work, and purports to be a quicker process of producing stereotype plates than the ordinary modes of casting, as by this improved method they are produced by the pressure of a rolling-press, and any number of these plates may be

made almost with the same rapidity that impressions are pulled on paper in the ordinary process of printing.

A quantity of hollow letter, or matrices of brass, are provided, instead of the prominent types usually employed in printing; these matrices are to be of the same external form and size as the common letter now used, so that the compositor may set them in the composing stick with the same facility, and in the same manner that he would set up ordinary types, excepting that they must read the reverse way.

A page of this description being locked up in a chase, or iron frame prepared on purpose, is to have a thin sheet of prepared pewter, or other soft metal, laid upon it, and is then to be run through a rolling-press of considerable strength, but similar in construction to those employed by copper-plate printers. By the pressure thus applied, a perfect stereotype impression, or counter-part of the matrices will be produced, and with great facility; all the delay of preparing moulds, melting metal, and casting, being thus obviated and the labour saved.

"The provision of the hollow letter will at first be more expensive, taking quantity for quantity, but as in most work the stereotype impressions may be taken by pages, and even by paragraphs, and afterwards combined for printing to any sized page, or for any sized sheet, the original letter or matrix being distributed as the pages or paragraphs are set up, it is evident that a very small quantity of this letter in *creux* would supply the place of a very extensive fount."

The second plan for multiplying fac-simile impressions applies to copper-plate works. "The original may be engraven on a flat surface of any dimensions, and transferred to a second flat surface of similar size, and from thence laid down, as copies of the original, upon any,

number of other flat surfaces by the use of plates of different gradations of hardness; as hard and soft steel, and copper, or soft steel, copper, or brass and pewter. To effect this, it is only required that the second flat surface employed should be a thin plate, when a sufficient pressure will be obtained to produce the transfer, whatever may be the dimensions of the plate, by merely passing the plate through the rolling-press, or mill, such as above-mentioned, for producing the stereotype fac-simile, the rollers of which need not exceed three or four inches in diameter; the size of the plates whereof the fac-simile may be thus multiplied is evidently not limited, as it necessarily is when the second impression is taken upon the outside of a cylinder."

Inrolled, July, 1822.

In the above process, we are reminded of the method of "*transferring of engraved and other work from the surface of one piece of metal to another piece of metal, &c.*" proposed by Mr. Perkins.—See Vol. I., page 159, of this Journal.

To Edward Dodd, of Saint Martin's Lane, in the Parish of St. Martin-in-the-fields, in the County of Middlesex, Musical Instrument Maker, for the Invention of certain Improvements on Pedal Harps.

[Sealed, April 24, 1822.]

THE first improvement is designed to strengthen the wood-work of the neck of a harp; and consists in gluing together a sufficient number of slips of strong and tough wood, of a convenient width, and from one-eighth of an inch to half an inch in thickness; or of different

thicknesses, so as to form the substance of the neck. These slips are respectively bent and screwed into the curved form required, and are left in that state to dry; after which the neck so formed is ready to be worked up. In this manner the neck of the harp is proposed to be made from back to front, but the fore part of the neck in the bass being wider and less subject to split, might be formed in the ordinary way; this improvement in glueing slips together being particularly applicable to the treble or bent part of the neck, where it is most subject to splitting.

The second improvement is in the slip under the bridge in the inside of the belly of the harp, which is proposed to be bevelled off on the sides, to follow the concavity of the sounding-board, formed by the tension of the strings; or very narrow additional slips of wood may be glued to both sides of the under slip of the belly, which answers the same purpose when bevelled off. The elasticity of the edges of the slip will prevent the breaking or cutting of the sounding-board, which often occurs by the present mode of making the slip, and it is recommended to make the slip about one inch wider than usual.

Under the third head, it is proposed to place and frame the ribs of the body of the harp in such a position as to act parallel or nearly so to the direction of the strings, instead of placing them at a right angle to the sounding-board, as usual.

The fourth improvement consists in boring the holes through the bridge for receiving the pegs and strings in a parallel direction to the strings, instead of perforating the bridge at right angles to the sounding-board, as is commonly done. It is considered that this will be found extremely convenient for getting the pegs in and out.

Inrolled, October, 1822.

To Benjamin Boothby, of the Iron Works, Chesterfield, in the County of Derby, Iron-founder, for an Improved Method of Manufacturing Cannon-Shot, by which a superior Shot is produced in the Solidity and Smoothness of its External Surface.

[Sealed, September 27, 1822.]

A BALL, in two halves, is to be turned with perfect accuracy to the size of the intended cannon-shot, out of a piece of hard wood or metal; this ball is then to be placed in a box, such as is generally used by iron-founders, and the box rammed up with sand in the same manner as it is usually done for all other dry-sand castings. When the process of ramming up the box is complete, the two half spheres are to be removed, and the concavities of the mould blacked with fine pulverized charcoal mixed with water. The box is then to be placed in a drying-stove, and when the sand is perfectly dry, the mould is fit to receive the melted iron for casting.

The advantages anticipated by this method of casting cannon-shot over the ordinary mode of using metallic moulds are, that the rarefied air will escape with facility through the sand, whilst in the metal moulds, it is frequently prevented from so doing, by pouring in the melted iron too rapidly. The air, when thus obstructed in its escape, occupies a space in the shot, and makes it unsound, consequently imperfect, and frequently useless; which defect is completely obviated by the improved process. A second advantage is, the preservation of perfect evenness where the neck, or runner of metal, is cut off; whereas, by the old mode, there is always an induration. A third advantage is, the perfection of the spherical form of this shot: by the employment of iron

moulds, the expansion of the metal, after being frequently heated, causes the mould to assume an elongated or oval form, by which means the shot produced is completely useless. By moulding in sand, if due care be taken to ram the boxes perfectly, and dry the mould thoroughly, the shot will always be of the same uniform roundness.

Inrolled, November, 1822.

To SAMUEL ROBINSON, of Leeds, Yorkshire, Cloth Dresser, for certain Improvements on a Machine for Shearing and Cropping Woollen Cloth.

[Sealed, 21st March, 1822.]

THESE improvements consist in the construction of an iron frame, which carries two revolving cutters, to be put in operation by the power of steam, and which are by the means of bands and wheels made to travel over the cloth from list to list, for the purpose of cropping or shearing its surface. The cloth intended to be shorn is laid upon a bed properly padded with blankets, and is there distended by hooks holding into the lists, by which means an extensive flat surface of the cloth is presented at one time to the operation of the cutters, which are about one yard in length, and travel over the entire breadth of the piece.

From a drum wheel turned by a steam-engine, or other power, a band is carried to a rigger upon the principal shaft of the shearing machine; upon this shaft there is also a large band-wheel, the endless cord from which extends to another wheel at the reverse end of the machine, and in its way embraces the pulleys which turn the revolving cutters; by this means the rotatory motion of the

principal shaft is communicated to the cylindrical cutters, and they are made to revolve with a considerably increased velocity. The carriage with the cutters is drawn forward over the cloth, with a slow progressive motion, by means of a cord attached to it, which winds upon a shaft that is turned by a toothed-wheel actuated by an endless screw upon the principal moving shaft before-mentioned, while the spiral knives coiled round the cylinders which press upon the cloth, by acting against ledger blades in the usual way, crop the pile from the face of the cloth from list to list. When the cutters have passed over the entire breadth of the cloth, and the carriage is about to return, sliders with inclined planes are brought under the frame, and it is by that means raised up from the surface of the cloth. The hooks may then be withdrawn from the lists and folded back, while another portion of the cloth is brought forward to be acted upon by the knives, and so on, until the whole length of the cloth has been shorn, by portions, from list to list.

Inrolled, September, 1822.

Original Communications.

To the Editor of the London Journal of Arts, &c.

Edinburgh, March 11, 1823.

SIR,

I am instructed by the Society for promoting the useful Arts in Scotland, to request your attention, to the annexed letter, and to beg that if you approve the plan suggested in it, you will have the goodness to notice it in the next publication of your Journal, as you will thereby do much toward me

known among those persons who are most interested in its adoption.

It is generally known that Artists and others are occasionally subjected to inconvenience and uncertainty, from the disagreement of the common Wire Gauges, the scales of which are not formed on any certain principle, and whose numbers have no rational connexion with the sizes they denote.

In the gauge most generally used, wire of about 31 hundredths of an inch diameter, is called No. 1, and the sizes decrease to No. 26, which is under .02 hundredths. Some classes of artists use gauges in which No. 1 denotes the smallest size, the dimensions increasing with the numbers. In the first case, wire thicker than No. 1 can have no name; and in the latter case, the reverse obtains. In both cases, it is found in practice, that corresponding numbers in gauges (which profess to be similar) often differ very materially; and an artist who may order wire from the manufacturer by a No. is liable to find that the gauge used by the latter, may differ a size or more from his own.

With a view to do away these inconveniences, and to obtain some advantages, it has been proposed to the Society, to sanction, by their recommendation, the establishment of such a *standard gauge as may be easily and accurately made by any tolerable workman, of which all copies must tally with one another, and in which the numbers may denote the actual diameters of the wire.*

To fulfil these conditions, all that is required, is to take two straight rulers (of any convenient length), to make their edges touch at the one end, and to separate them near the other by a cylindrical or spherical body, of half an inch diameter. If the rulers be unalterably fixed

in this position, and the side of the triangular space lying between the points of contact with the cylinder at the one end, and the junction of the rulers at the other, be divided into 50 equal parts, and numbered from 50 down to 0, then the divisions will shew the diameters of wire in hundredths of an inch. If the dispart, instead of being made $\cdot 50$ is made $\cdot 05$ hundredths, then the divisions would shew thousandths, which would make a convenient gauge where fine wire should be most used.

The three faces of the rulers which remain unoccupied by the standard scale, may be furnished with divisions and numbers, formed from any of the gauges at present in use, which would enable artists to ascertain sizes, according to both the present and the proposed scales at the same time.

It will occur to every intelligent workman, that the dispart at $\cdot 50$ should be made by the actual insertion of a cylindrical body, and not by compasses, as a small variation in the width must take place, according to the length and angle of inclination of the rulers.

I have the honour to be,

Sir,

Your most obedient Servant,

JOHN ROBISON, *Secretary.*

To the Editor of the London Journal of Arts.

SIR,

THE attention of the Public having been lately excited by the introduction of a new material, from America, as a substitute for Leghorn straw, and for which the Society of Arts last year voted a reward to Miss Woodhouse, of Connecticut,* permit me to make a few

* See novel inventions, new material for Straw Plat.

observations upon the practicability and advantages of employing some of our English grasses, for the same purpose, many of which possess the capability of being wrought into bonnets, of a quality considerably superior to the best Leghorn straw plat.

The time of the year is approaching, when the fair sex may very judiciously employ their leisure in collecting grasses for the making of bonnets, similar both in beauty and durability to those from Leghorn. I would therefore observe, that they should be gathered before the head or seed is ripe; because when the seed is ripened to perfection, grass, and also straw of every description, is brittle,—it may not be of so good a colour, or bear so strong a resemblance to Leghorn in this state, but the colour may readily be altered by any of the common modes of bleaching with brimstone. Care should be taken to gather the grasses as near the same length, thickness, and colour, as can be found; and as it is only the last joint that is used, it is not necessary to pluck it up lower than the first or second joint.

There are a very great variety of these grasses growing spontaneously in our meadows, fields, and lanes, but the following appear to me the most likely: *Poa pratensis*, or smooth-stalked meadow grass,—it constitutes a considerable part of the herbage of rich meadow land, but is also found on dry banks, and even on walls.

Poa trivialis, rough-stalked meadow grass; it is also called bird grass, (by the seedsmen), also fowl-grass and meadow grass. This is found in abundance in moist meadows, and by the sides of ditches.

Avena flavescens, yellow oat grass:—this is found in some meadow pastures, and on hills, particularly in a calcareous soil.

Erostris vulgaris, fine bent grass, very common in

meadows, pastures, and borders of fields, but chiefly growing on poor, dry, and sandy land; this is a most excellent grass for the purpose, being long in the last shoot, and particularly fine and tough; but I have not a doubt that many others may be found in every situation, and in every district, and I do not know any employment more rational or more agreeable than this for English females, or more likely to become of national benefit.

I am, Sir, yours, &c.

W. GOODMAN.

Warwick, March 15.

To the Editor of the London Journal of Arts.

SIR,

AMONG other improvements in the various walks of science and the arts, the subject of scholastic discipline may not be thought unworthy a place in your valuable Journal; I am therefore induced to solicit your permission to occupy a page or two in describing a novel, and, as I think, extremely valuable, plan, adopted by Mr. Adams, sen. of Edmonton, in the regulation of Latymer's Free School at that place.

One hundred and six boys are admitted on the establishment at the age of six years, to be taught English reading, writing, arithmetic, Latin, and the mathematics, and may remain students until sixteen years of age. The boys are numbered in numerical order from 1 to 106, according to seniority, and they have likewise a series of other numbers referring to their respective advancement in the different branches of learning. A small cord having a leather medal tied to it, describing his number on the establishment, is suspended over the shoulder of every boy; and also, upon the same cord, eight other small leather medals are strung in the way of

beads, each marked with a letter referring to one of the branches of study, and also with a number descriptive of his advancement in that branch of education. The divisions of study to which these small medals refer, are reading and elocution, writing, (including the ornamental hand,) arithmetic and Algebra, grammar, (English,) spelling, Latin, mathematics, including geometry and mensuration, and lastly a medal indicative of general behaviour.

A boy on admission to the school takes, of course, the No. 106, in the establishment, and, having no preferment, receives all the small medals at the lowest denomination. His ability and behaviour, however, in a few days probably entitles him to advancement, and in reading he may have reached the boy 103; in writing and arithmetic is stationary; in grammar, 104; in spelling, 99; in Latin and mathematics, stationary, and in behaviour, 96. Thus his station and conduct is marked by the numbers on the small medals which he carries, and these numbers are registered, at stated times, in a book for the inspection of the trustees of the school, who annually bestow rewards, both honorary and pecuniary, upon such boys as appear to have excelled.

It is impossible to describe the stimulus to emulation which this plan has created among the scholars of the establishment, and the great assistance it affords in rousing the energies of youth, naturally careless, inattentive, and indolent. The operation of the plan does not confine itself within the walls of the school-house, but extends to attainments that may be effected by the scholar elsewhere, which being produced to the satisfaction of the master, obtain that advancement in the particular branch of study to which the performance refers; and the eighth division of the pupil's education, (*viz.*) be-

haviour, embraces his general conduct both in and out of school.

An extract from the school register may render the plan here described still more evident, and for that purpose the following has been obtained :

LATYMER'S FREE SCHOOL REGISTER,

March, 1823.

Nos.	NAMES.	Reading.	Writing.	Arithmetic.	Grammar.	Spelling.	Latin.	Mathematics.	Behaviour.
1	Parsons, Thomas	10	7	2	13	16	22	4	4
2	Skeggs, Abraham	12	8	7	3	20	12	17	5
3	Sutton, Charles	3	6	1	4	5	3	5	10
4	Gates, James	30	5	24	45	43	25	30	25
5	Brown, Charles	38	10	18	14	31	31	22	24
6	Pidgeon, William	13	26	5	11	17	18	19	13
7	Woodward, Thomas	32	27	23	27	35	24	14	38
8	Skeggs, Joseph	21	31	20	21	28	23	9	14
9	Rigglesworth, Wm.	4	23	9	2	18	2	3	2
10	Cowel, Daniel	46	39	35	47	50	40	43	19
11	Saville, James	19	9	22	28	34	21	28	59
12	Robins, James	24	4	26	35	13	29	23	11
13	King, George	43	44	43	53	33	39	34	52
14	Lough, Frederick	8	1	6	9	4	4	8	8
15	Burgess, William	16	20	11	17	19	16	27	18
16	M'Guire	41	38	41	29	24	35	44	94
17	Kerry, Samuel	6	3	3	10	8	5	6	9
18	Howston, Robert	52	40	39	41	49	44	42	21
19	Jennings, William	18	19	17	24	21	30	26	31
20	Young, Charles	22	24	25	16	15	11	18	49
21	Scott, David	50	16	52	48	47	49	38	36
22	Leonard, John	1	2	4	1	2	1	1	3
23	Wallar, John	20	21	19	23	38	14	13	17
24	Sutton, Edward	14	11	8	5	14	13	24	34
25	Hodge, John	15	12	15	7	3	15	15	16
26	Gates, George	26	37	21	37	23	34	39	26
27	Brightwell, Joseph	5	13	10	12	7	8	11	1
28	Lough, Edward	37	43	33	42	44	48	29	23
29	Rowsell, Henry	36	29	47	33	36	45	48	33
30	Brightwell, George	55	32	42	56	54	50	41	46

From the above it will be seen that the boy, No. 1, is not the best reader by ten, the seventh in writing, the

second in arithmetic, the thirteenth in grammar, and sixteenth in spelling; a very deficient Latinist, standing at twenty-two, but a good mathematician, and well behaved; while the boy, No. 4, excels in writing only, being deficient in every other branch of education; and the boys, Nos. 5, 7, 10, and 13, are bad in every respect. But the boys, No. 14, 17, and 27, stand high in the scale of advancement, and the boy, No. 22, evidently displays the best ability, being at or near the head of every branch of education.

I have not thought it desirable to copy the register farther, as its plan must be perfectly understood, by inspecting the portion given; and if it should appear to possess sufficient merit to claim a place in your Journal, which is so judiciously devoted to the promulgation of improvements connected with the Arts and Sciences, the insertion will oblige,

Sir, yours,

Φιλελογος.

Marine Lightning Conductor.

SOME experiments have lately been performed before the navy-board, for the purpose of demonstrating the advantages of lightning-conductors fixed to the masts of ships. An electrical apparatus was placed in one of the apartments of Somerset House, next the River Thames, and a communication made therefrom to a vessel at anchor a short distance from the shore; by this means discharges from a very powerful electrical battery were made to represent the effect of lightning falling upon the ship, and the advantages of perfect conductors were demonstrated. These conductors were formed by strips of copper laid a quarter of an inch into the mast, which by

communicating at bottom with copper-bolts driven into the keel, led off the electricity from the mast head into the sea, without producing any mischievous consequences.

The experiment of Mr. Harris, the inventor, are thus described:—From the mast head of the vessel a wire was conveyed across the water to the electric battery in the room; at some distance astern of the vessel was a boat moored, in which was a loaded howitzer or small gun; from this gun, a flexible line was continued to the negatively charged side of the jar in the room, to form the electric circuit; the discharge was then made by the wire to the mast head of the vessel, and instantaneously the gun fired, the spark having passed on in its circuit to restore the equilibrium, which it could not do without igniting the powder on the touch-hole of the gun; the firing of the gun proved that the spark had passed down the conductors on the masts, through the keel, and so on to the point where it was intended to restore the equilibrium; the lower mast of the vessel had detonating powder in contact with it, and if the conductors had not transmitted the charge in the most perfect manner, the detonating powder must have exploded. This experiment was then performed while the masts were being lowered; and again, when they were re-hoisting, and with the same complete success; thereby proving, that in whatever situation the masts may be, the conductors, on this principle, are protections.

He then passed a strong charge along an exceedingly small wire, so small that the charge refused it; yet, though this conducting medium was destroyed, the charge continued its course along a conductor on the model of a mast, (charged with powder,) connected with the wire when in its perfect state, and thence passing to a distant spot, where the conducting principle ceased, ex-

ploded other powder placed there, for the purpose of proving the charge to have been perfectly transmitted. The conclusion drawn from this experiment is, that, though a cloud should be so powerfully charged as to destroy a continuous conductor, the charge would pass forward in the required direction; that is, through the bottom of the vessel into the sea, by the bolt driven in the keel for the purpose, and be, of course, there dissipated.

He then cut off the continuous conductor which led from the mast, and discharged the spark as before, which again fused the wire, and there being then nothing to convey it beyond the mast, the charge burst on the mast and exploded the powder, which it had before, as was intended, passed; thus assimilating the experiment to the effect which would be produced in nature should a mast be struck by lightning, without being protected by the happy invention of continuous conductors. It is almost unnecessary to observe, that the powder being exploded in the mast, is used as the only proof, upon an artificial scale, that can be adduced of the charge passing in that line; whereas, in nature, the mast struck would be shattered into pieces; but no machine can give so strong a stroke as to shiver even a small model.

His principle was further elucidated by an experiment approximating, as nearly as possible, to the manner in which a thunder-cloud approaches the point through which it passes into the sea. A hollow wooden ball, gilded and covered with a mass of cotton wool, to represent a thunder-cloud, was attached to a silken line, and when charged with the electric matter, was made to pass along the silken line till it came in contact with the mast-head of a model of a vessel floating in water, (the masts being fitted with continuous conductors,) and the water

being made the medium through which the spark was to pass on the circuit to the negative side of the jar, from whose positive side the ball had been charged; when, at the moment of contact, a dense spark was seen passing down the conductor, and without igniting the detonating powder contiguous to the mast, inflamed other powder in a small model of a boat at a distance, after passing through the bottom of the vessel by the bolts in the keel; the top-gallant was surrounded by a brass ball. On repeating the experiment with a point at the top-gallant mast-head, the discharge became dissipated by the action of the pointed mast-head, and presented in the dark a luminous appearance, and the dense shock was avoided."

The advantages of electrical conductors to ships may in many cases be great, but there are situations at sea, as most nautical men are aware, in which no precaution could avert the direful effects of lightning, in which the whole atmosphere presents one sheet of electric matter, and every point of the ship becomes a conductor. The experiments above quoted, present but little novelty, and indeed are not altogether as conclusive as might be wished: we shall, however, take a future opportunity of considering the subject, and perhaps draw some comparisons between the plans heretofore employed, and those now proposed.

Nobel Inventions.

Perkins's Steam-Engine.

PERHAPS there never was a subject connected with the Arts which has excited so much sensation in the scientific world, or given birth to such warm discussion, as the new construction of steam-engine proposed by Mr. Perkins.

The subversion of established theories which the plan involved ; the vast reduction of expense in the article of fuel anticipated ; and the extremely high pressure at which the engine was proposed to be worked with perfect safety, were anomalous features that have been pronounced, with unqualified condemnation, as utterly impossible. We have, however, now the satisfaction of stating that Mr. Perkins has realized all that he promised, and that he has, by experiment, (the only sure ground of philosophical reasoning) demonstrated that the engine will perform under the circumstances and with the advantages he anticipated.

The specification of this patent is not yet due ; we are therefore precluded from giving more than a general idea of the invention : in our next Number, however, we hope to be permitted to lay before our readers a more particular description of its construction, with a plate exhibiting its general detail. The generator in place of a boiler, as we stated in our last, contains about eight gallons, is a cylindrical vessel made of gun-metal, about three inches thick, and closed at both ends ; it is placed upright in the middle of a cylindrical furnace, and filled with water. This water is subjected to a very great pressure, and under those circumstances, is heated by the surrounding fire to a very high temperature. A valve is introduced in the top of the generator, and loaded with a weight equal to the pressure within. An injecting-pump is now employed to force a small quantity of water into the generator, which displaces a corresponding quantity of heated water from the generator ; this passes into the induction-pipe, and instantly becomes steam, exerting a very great expansive force, which, acting upon the working-piston within the cylinder of two inches diameter, placed horizontally, causes it to perform its stroke of twelve inches.

The reciprocating motion of the piston works a rotatory valve, which alternately opens and shuts the induction and eduction passages, by which, as in other engines, the steam, after exerting its force upon the piston, escapes to the condensor, but with this peculiar circumstance attendant,—viz., the condensation is effected under a pressure of seventy pounds upon the inch. The operation of generating and of condensing the steam is so instantaneous, that when the engine is in full work, the piston performs about two hundred and fifty strokes per minute, and the motive force thus produced is, by means of the piston-rod, communicated to the crank and fly-wheel of the engine, and thence, as a moving power, to other machinery.

The space occupied by the engine and all its appendages, as we before stated, does not exceed an area of six by eight feet, though its power is calculated at ten horses, and it is considered that no part of the apparatus would require enlargement, (except the working cylinder) for an engine of fifty horse power; the consumption of fuel is about two bushels per day.

The perfect safety from any disastrous consequences attendant upon an accidental explosion have been fully proved by actually bursting the apparatus several times in the presence of many persons. The circumstance of retaining the heated water in the generator, under a considerable pressure, and only allowing it to assume the form of steam, after it has escaped from the generator, precludes the possibility of exploding that vessel; as the water, however much its temperature may be raised, is, while in the form of water, almost non-elastic; and the small quantity of steam generated from time to time in the induction-pipe, for the purpose of working the piston, could not, in the event of an explosion, then be attended

with any extensive consequences ; but to prevent the possibility of any such accident, a copper bulb is introduced in a part of the steam pipe, which is calculated to burst at one thousand pounds pressure; while the engine is intended to work from five to seven hundred, and the whole is proved to sustain a force of two thousand pounds upon every square inch of its surface.

The consequence of working the engine at a pressure greater than it is calculated to sustain, would be, that the bulb must rend open, and the steam blow out through the fracture, which has been repeatedly done; and here a most singular effect is observable; instead of the steam, as it escapes, scalding, it is *only warm, not hot*, a property attendant upon steam raised to a very high temperature, which is not generally known, and the theory of which is still less understood; some experiments, however, have been made, which tend greatly to explain the cause of this phenomenon, and which we shall on a future occasion submit to the consideration of our readers.

It is now perhaps evident to the most sceptical, that something of importance has really been effected, and it is no less obvious, that theory alone would never have led to these results; the advantages of an extensive practice, and close observation, have progressively developed facts which have now become systemised and arranged by Mr. Perkins, and the very great opposition which has been raised to his project, is the best possible proof of its originality.

New Material for Straw Plat.

DURING the late war, the importation of hats and bonnets, manufactured of the material called Leghorn plat,

was almost prohibited ; but of late the importation of that article has prevailed, very much to the prejudice of the working-class of females and children in the counties of Hertford, Bedford, and Buckingham. The Leghorn straw, (as it is called, though we believe it is not the stalk of corn), is used in its entire state ; and being fine and extremely durable, is very much preferred for the superior kind of bonnets to the plat made from English split straw : it has therefore become an object of considerable importance to discover a material of English growth, possessing similar advantage to the Leghorn straw. This has been done to a certain extent, as may be seen by Mr. Goodman's communication in our present Number ; but the most perfect specimen we have seen, is a bonnet presented to the Society of Arts, by Miss Woodhouse, the daughter of a farmer at Weathersfield, in Connecticut, which she had manufactured from the stems of a species of grass which grows spontaneously in that part of the United States. The botanical name of this grass is *Tickle-moth*, and the specimen produced was declared by several of the principal dealers in London to be greatly superior, both in fineness and colour, to the best Leghorn plat, and that the introduction of this grass into England, either by importation or cultivation, would probably be of great public advantage. The Society of Arts, in consequence of this communication, last year presented Miss Woodhouse (now Mrs. Wells,) with their Silver Medal and twenty guineas, having received (besides the bonnet, which is deposited in the Society's Repository) specimens of the grass, and a quantity of the seed, which have been distributed in various parts of Great Britain and Ireland, and appears to germinate very successfully both under cover and in the open air. In the latter situation it has thrown up a thick mat of long and fine herbage,

but has not flowered; it is therefore probably perennial; and if it endures our winters in a healthy state, will, in all probability, prove a valuable pasture-grass. The treatment of the stem, for the purpose of manufacture, is thus described in the words of Mrs. Wells herself, addressed to the Society :—

Weatherfield, Connecticut, Dec. 20th, 1821.

“ I REGRET that the proper season for cutting the grass had elapsed before I received the communication from London. The small quantity which I had previously gathered I transmit herewith to the Society, part of it prepared for platting. It may be considered as a specimen of the usual fineness of the grass, as it has not had a straw, coarse or fine, selected from it.

“ I am able to give no account of the method of cultivation, having never known it cultivated in this country. It grows spontaneously and abundantly in our meadows. It is more common in fields that have not been highly manured, but that are rather reduced in strength and richness of soil; in a few fields it has been observed that gypsum and manure have destroyed this grass, and introduced clover. I am able to procure but little of the seed; as it has never been known in this country, very little of it has been preserved.

“ I have prepared the grass for manufacture in the following manner: I have cut it in the fields from the time of its flowering until the seed is nearly matured; that part only is used which is between the upper joint and the top or panicle; on this I pour boiling water and then dry it in the sun; this operation I repeat once or twice, or until the leaves which sheath the stem come off. I then bleach it; but for this purpose I have used no other apparatus than what every farmer's house furnishes.

“In the first place I prepare some soap and water, in which I dissolve pearl-ash until it can be tasted; in this solution I moisten the grass and then set it in an upright position in the bottom of a cask; I then burn brimstone in the cask by means of a small heated kettle or dish of coals, and close the cask at the top with blankets, so as to confine the smoke. This fumigation I continue until the grass, previously moistened by the pearl-ash, &c., becomes dry, which will require about two hours. - During this operation the kettle will generally require to be reheated, or the coals to be replenished once or twice. The grass is now ready for plaiting. After this is performed, and the bonnet is sewed together, I fumigate it again with brimstone in the same manner as before, being careful to place the bonnet in a situation in which it will be penetrated by the smoke; the bonnet is now finished by pressing, for which purpose I have used only a common smoothing iron. The only caution necessary in this operation is, not to have the iron heated so much as to scorch the grass.

“SOPHIA WELLS.”

Reclaiming Waste Moor Land.

The Gold Medal of the Society of Arts has been awarded to J. Peart, Esq. of Suttle, Yorkshire, for reclaiming fifty-six acres of waste moor land, situate at Grassington and at Ingleton, in that county. Mr. Peart states that from the complaints of labourers in husbandry wanting employment, he was induced to attempt the cultivation of the two parcels of waste ground above-mentioned. The land at Ingleton was of the worst quality, being a short ling, on a black barren turbary soil; that at Grassington was covered with a strong ling

on turf earth, with yellow soil under the turf. The situation of the land being too high to admit of its being employed advantageously for corn, it was endeavoured to be converted into grass.

The usual manner of treating this sort of land, has been either ploughing, or paring and burning it, and then after draining the wet part, to sow the whole with grass seeds, and lime the surface; but it has frequently happened that the old sward had not been completely destroyed, but has grown in the seams, and the surface by ploughing not being made perfectly level, a great part of the lime has fallen into the seams, and a considerable part of the surface of the land remained uncovered.

The plan pursued by Mr. Peart has been first to burn the ling where it was strong, then to grave the land with spades; after this was done the whole surface was made perfectly level, by cutting it with sharp spades. The ground was then limed and sown with grass seeds grown in the neighbourhood, and with white Dutch clover; part of the ground was sown before spreading the lime, and part afterwards. The advantages of graving was getting the ground turned up deeper than if it had been ploughed, and bringing up a yellow soil which generally lies under the turf; this tends to make the land firmer and more congenial to the growth of grass seed, than turf soil, and also assists in getting a much more level surface.

Great importance is attached to the perfect levelling of the ground, and therefore Mr. Peart employed hands to perform this part of the work by day labour, in preference to paying by quantity. A much greater quantity of lime was laid, and a greater quantity of seeds sown, than is the usual practice, but it is expected that notwithstanding the great expences, the speculation will be profitable, as

grass already appears in a very flourishing state, and that in two years the land will be capable of fattening any sort of cattle, and be worth the rent of twenty-five or thirty shillings per acre. The total expence of cultivating the forty acres of moor land at Grassington, amounted to £574 11s. 7d. and of sixteen acres at Ingleton, £253 0s. 10d.

Polytechnic and Scientific Intelligence.

Proceedings of the ROYAL SOCIETY.

January 23.

MR. MACDONALD resumed and concluded the reading of his paper on magnetism. The principal subjects of his observations were the phenomena of the variations of the needle, which the author accounts for by an hypothesis, possessing some claims to novelty though very fanciful. He observes that from Captain Parry's discovery of the north west magnetic pole, and from other circumstances, it would appear that what is called the *variation* of the needle, is, in point of fact, no variation at all, so that the north pole of the earth does not possess any magnetic attraction. The situation of the pole discovered by Captain Parry, he describes as at the intersection of 73° north latitude, and 101° west longitude. Mr. Macdonald has ascertained that when the north pole of a magnet is presented to the south pole of the needle, the oscillations describe segments decreasing, but still performed in equal times; and he reasons that if the north pole of the earth has any attraction, these oscillations, when upon the line of no variation in the neighbourhood of the north-west pole, which was crossed by Captain

Parry, ought to be accelerated on approaching it, and thus the fact may be discovered.

Mr. M's. supposition is, that the north west magnetic pole has a rotatory motion, producing the two lines of no variation in the northern hemisphere; and that during the 159 years from 1657 to 1816, in which the needle was advancing to the west, it described one-fourth of its orbit. This theory of the earth's motion, he remarks, is liable to one objection, the supposed solidity of the earth, an objection which we think will not easily be obviated. He argues to remove it, that there is as much reason to believe its solidity as its hollowness; for there is no physical proof of either, and the subject is one of the hidden and impenetrable secrets of the Almighty. The Mosaic records describe the earth to be full of water, as contained in a shell, and many passages of Scripture strengthen such description. Various facts in astronomy also tend to show that the earth does not consist of solid matter increasing in density to the centre.

Mr. M. also supposes that there is a south east magnetic pole, producing by its rotation the two lines of no variation in the southern hemisphere, and in confirmation of this idea, he cites the circumstance of the aurora borealis never being seen to rise in Greenland, either in the north or north west, but in the south east or east.

In former papers on magnetism, inserted in the Philosophical Transactions for the years 1796 and 1797, the author has adopted Dr. Halley's theory of four magnetic poles; two of which it has since been ascertained did not exist where they were described to be. He had also some theories on the influence of the sun's rays, which he is now inclined to ascribe to galvanic agency; but he still thinks the sun has some action on the diurnal variation of

the needle as its increase from March to October seems to prove. He further suggests that a magnetic battery might be constructed, probably by a proper arrangement of positive and negative poles; and concludes by expressing a hope that what he has stated may induce some one better qualified than himself to enter into a minute investigation of the subject.

The Society adjourned over the Anniversary of the Martyrdom of Charles I.

Feb. 6.—A letter was read from Sir T. Brisbane, Knt. F. R. S. to the President, dated Paramatta, New South Wales, September 6th, 1822. It communicated the result of the first observation made at Paramatta by Mr. Rumker, relative to the obliquity of the ecliptic at Paramatta; the longitude of that place and Sydney, the re-discovery of M. Encker's triennial comet, and the length of Captain Kater's invariable pendulum vibrating seconds at Paramatta.

An account of some caves discovered in the limestone quarries, at Oreston, by J. Whitby, Esq. in a letter to J. Barrow, Esq. F. R. S. was read at the same meeting. Two caves were discovered at an elevation of 93 feet above the sea at high water in spring tides, in the quarries upon the cat-water, from which is obtained the stone used in the breakwater. They communicated with each other by a sort of gallery which opens to the quarry, about the size of a man's body; and contained bones, in one cave imbedded in clay and rubble, and in the other adhering to the sides. They have been examined by Professor Buckland, of Oxford, and Mr. Warburton; and the paper is accompanied by a drawing, illustrative of their form and position.

Subjoined was a description of the bones found in the caves, by Mr. W. Clift, Conservator of the Museum of

the Royal College of Surgeons; communicated by Sir E. Home, V. P. R. S. Some caves were discovered contiguous to the same spot in 1816 and 1820; and which contained the bones, the first of a species of rhinoceros, and the second of a species of bear, and of an unknown antelope or deer. Those now discovered are altogether different, and evidently belong to the different genera of the ox, the deer, the horse, the hyæna, the wolf, and the fox. The greater number of these were firmly bedded in clay; and none of them had been knawed, except the radius of a young wolf, which exhibited traces of the canine teeth, and incisions of an animal apparently of the size of a weasel. What is rather curious, the bones of the various graminivorous animals were found together; but those of the carnivora at a distance from each other; all of them were very fragile and white; but when immersed in water, (of which they were so extremely absorbent as to adhere to the tongue with such strength as to support their own weight,) much effervescence took place, and they became black, though they resumed their former appearance on being dried; this was particularly the case with those of the carnivorous animals. They were found to have lost nearly all their animal matter, some of them were broken by the workmen in removing them, while others fell to pieces on exposure to the air; in which circumstance they resemble the tusks, &c. of the elephant found in the sand at Brentford and other places near the river Thames, and which dwindle into lozenge shaped or cubic fragments.

These observations are accompanied by a more precise and anatomical description, illustrated by drawings. There are the bones of twelve oxen, larger than the usual species, and with short conical horns standing upright; a few which appear to have belonged to a deer, but

wanting the head, horns, and teeth; some small bones apparently of a calf or fawn; the bones and teeth of about twelve horses, which must have been fourteen hands high; several wolves of the common size; and *five or six hyænas*, including two jaw bones with the teeth! The whole of these curious fossil remains have been deposited by Sir E. Home, in the Museum of the College of Surgeons. Mr. Whitby expressed his opinion that no communication had existed between the caves and the surface of the country since the flood.

Feb. 13.—A letter from J. Young, M. D. Foreign Secretary to the Society, to the President was read; it was upon a subject mentioned in Sir T. Brisbane's communication; Mr. Rumker's re-discovery of Professor Encker's little triennial comet, near the place assigned it by the Professor's computation; and which Mr. Rumker first observed on the 2nd of June last, from which time it continued visible till the 23rd, when it was lost in the light of the moon, and could not afterwards be discovered.

Part of a paper by Mr. Goldingham relating to some experiments made at Madras, on the velocity of sound, was read also at this meeting.

Feb. 20.—The reading of Mr. Goldingham's paper was completed; a paper was commenced on the question, Does an evolution of Heat take place during the coagulation of the Blood? by Charles Landamore, M. D. communicated by Sir H. Davy, Bart. P. R. S.

The Circle of the Arts.

A Society has been established at Paris under this title, which proposes to decree rewards annually, to deserving artisans; to provide for the execution, at its own charge, of paintings, engravings, &c. and to ad-

vance sums of money to such as are thus employed ; and to unite, in a sort of focus, the brilliant productions of art.

Astronomical Society.

This institution held its Third Anniversary at the Rooms in Lincoln's Inn Fields, on Friday the 14th of February, when a report from the council was read, stating that the society consisted of 187 members and associates, among whom were most of the eminent astronomers in Europe. The funds of the institution were likewise described to be in a prosperous state, and great progress had been made in establishing an astronomical library, which would shortly be opened. The council paid a just tribute of respect to the memories of the late president, Sir William Herschel, Sir R. Englefield, Dr. Hutton, M. Delambre, and several other valuable members of which the society has been recently deprived by death ; and in concluding their report, called upon the members to promote the objects of the institution by every means in their power ; recommending a minute investigation of the heavens, by each member examining a small portion, and the transmission to the society of papers containing the result of their observations.

The following gentlemen were then elected officers for the ensuing year :

President.—H. T. Colebroke, Esq. F.R.S. and L.S.

Vice Presidents.—F. Bailey, Esq. F.R.S. and L.S. ; Major T. Colby, Royal Engineers, LL.D. F.R.S. and L.S. ; Davis Gilbert, Esq. V.P.R.S and F.L.S. ; Sir B. Hobhouse, Bart. F.R.S.

Treasurer.—Rev. W. Pearson, LL.D. F.R.S.

Secretaries.—C. Babbage, Esq. M.A. F.R.S. L. and E. ; J. Millington, Esq. Prof. Mechan. Phil. R.I.

Foreign Secretary.—J. F. W. Herschel Grey, M.A. F.R.S. L. and E.

Council.—Capt. Beaufort, R.N. F.R.S.; G. Dolland, Esq. F.R.S.; B. Gompertz, Esq. F.R.S.; S. Groombridge, Esq. F.R.S.; J. Horsburgh, Esq. F.R.S.; D. Moore, Esq. F.R.S. and L.S.; P.M. Roget, M.D. F.R.S. Maj. Gen. J. Rowley, Royal Engineers, F.R.S.

Linneæan Society.

Feb. 4. Two communications were read. A continuation of a paper by Dr. W. Jack, on *Lausium* and other Malayan Plants; and a catalogue of the Land and Fresh-water Shells found in the county of Suffolk, by the Rev. R. Sheppard, F.L.S.

Feb. 18. Major General Hardwicke, F.R.S. and L.S. read a description of the *Sciurus Sagitta* of the *Buceros Galeatus*; of a New Species of *Phasianus* of the supposed Female of *Phasianus Cruentus*; of a small Antelope called *Goral*, a native of the Nepaul Mountains; and of an insect which appears to be a new species of *Scutigera*, the whole were illustrated by figures.

Geological Society.

Jan. 3. An account of the Geological Structure of the Bahamas, by the late Rev. J. Wright, transmitted to Professor Buckland, was read.

Jan. 17. A paper was read on the Beds of Limestone and Clay of the Ironsand of Sussex, by G. Mantell, Esq. and C. Lyell, M.G.S.; drawings and descriptions of many remarkable fossils were subjoined.

C. Daubeny, M.D. F.R.S. and Professor of Chemistry at Oxford, read a paper illustrative of the strata cut through in the Seven Rakes' Mine, near Matlock, Der.

byshire, accompanied by various mineral and geological specimens.

The Anniversary of the Society was held on the 7th of February, when the following officers and council were elected.

President.—W. Babington, M.D. F.R.S.

Vice Presidents.—A. Aikin, Esq. F.L.S.; J. Bostock, M.D. F.R.S. and L.S.; G. B. Greenough, Esq. F.R.S. and L.S.; W. H. Pepys, Esq. F.R.S.

Secretaries.—W. H. Filton, M.D. F.R.S.; C. Lyell, Esq. F.L.S.; Mr. T. Webster.

Foreign Secretary. H. Henland, Esq.

Treasurer.—J. Taylor, Esq.

Council.—Hon. H. G. Bennet, M.P. F.R.S.; Rev. W. Buckland, F.R.S. Prof. Min. and Geol. Oxford; H. J. Brocke, Esq. F.R.S. and L.S.; H. T. Colebrooke, Esq. F.R.S. and L.S.; Major T. Colby, F.R.S. L. and E.; T. Horsfield, M.D. F.L.S.; J. Laird, M.D.; C. Stokes, Esq. F.R.A. and L.S.; T. Smith, Esq. F.R.S. and L.S.; H. Warburton, Esq. F.R.S.; P. B. Webb, Esq. F.L.S.; W. H. Wollaston, M.D. F.R.S.

Society of Arts.

Since our last notice of this society, the different committees have pursued their labours in investigating the merits of the following communications:

Committee of Agriculture and Rural Economy.

On a mode of preventing mildew in wheat,—an implement to take up potatoes,—a cram or machine for watering turnips,—a machine for watering turnip-seed, at the time of sowing.

Committee of Chemistry.

On oxy-hydrogen blow-pipe,—purifying whale oil,—earthen crucibles,—Cornish ditto,—samples of British marbles,—charging gas retorts with coal,—hatching chickens by steam—a kiln for drying clay.

Committee of Polite Arts.

On steel engravings,—an instrument for drawing in perspective,—an apparatus for drawing flowers,—preventing the forgery of bank notes,—a syringe for oil colours.

Committee of Mechanics.

On an instrument for solving trigonometrical problems by means of three graduated scales, moveable on each other, for the purpose of constructing the sides of any triangle; and three graduated semi-circular arcs to be applied to the points and sides of the angles for the purpose of finding off the value.—Another instrument for the same purpose, upon nearly the same plan.—A screw for the security of property, having a channel cut round it for the reception of a tooth which falls into it when the screw is driven home.—A door-fastening, consisting of a pair of cross iron-bars, or bolts, connected to a lock.—A tramming engine for winding several threads of silk together, previous to throwing or twisting.—Methods of suspending the top-sail yards of ships, and securing the shrouds by hooks and eyes.—A sun dial, formed upon curved surfaces.—A method of lighting a binocle by suspending the lamp on jimbals above the compass.—An instrument for taking samples of strata, a sort of augur with a cup at bottom.—Methods of raising and striking the top-masts of a ship.—Mode of attaching lamps to carriages, by sliding-bars.—Steam cylinders for drying

goods.—A mode of preventing carriages from overturning in the event of a wheel coming off, by the introduction of a supernumerary wheel.—A support for a carriage in the event of the horse falling, by means of an iron leg let fall from a spring.—A coffer dam formed by a double wall of wood, united at bottom in a wedge form, and sheathed with iron, which being floated to the spot where it is intended to be stationed, the space between the walls is then filled with water, the weight of which is intended to force it into the ground.—A grappling stick to prevent persons from drowning.—A floating raft for the conveyance of merchandize, supported upon two air-vessels, which is intended to be propelled by paddle-wheels.—A mode of carrying off the particles emitted by dry-grinding, by means of a current of wind driving it through a tube to a chimney, the wheel being covered by a board.—A centring, or wood frame for supporting an arch of a bridge when building.—An air-stove, the fire case within the jacket being formed with many angular sides.—A marine chronometer; the balance suspended upon two long flat springs, the twisting of which answers the purpose of a balance-wheel.—A repeating watch; the striking part being detached from the going.—An eight-day clock.

Committee of Manufactures.

On English grasses for plaiting, as substitutes for straw.

Committee of Colonies and Trade.

On curing British herrings in the manner of the Dutch.
Wines, of several sorts, imported from New South Wales.

Notwithstanding the great number of subjects submitted to the Society, during their present sessions, the

following only have been approved, and rewards adjudged accordingly.—

The silver medal to Lieutenant Green, R. N. for his improvements in the rigging of ships.—The silver Vulcan medal to Mr. Shenton, for his engine for trammimg of silk.—The gold Vulcan medal to Mr. Mills, for the first impression of his die presented to the Society.—The silver medal to Mr. Blaxland, for specimens of wine from New South Wales.—Fifty guineas to Mr. Donovan, for his process of curing herrings.

Surrey Institution.

Since our last notice of this institution, two courses of lectures have been delivered, the one by Dr. Crotch on Music, the other by Mr. Woodward on Electricity. The doctor pursued the same train of subject which has occupied him for several successive courses, and after tracing the history of music, illustrated the characteristics of national airs, many of which he performed with that exquisite feeling and fine execution, which at once demonstrated his sublime conception and refined taste. Mr. Woodward, who is an amateur in science, discussed the theories and exhibited the phenomenon of electricity, in a manner that reflects the highest credit upon his exertions and ability; indeed, the clear and unembarrassed delivery of this gentleman, may be considered as a model which several of our professed lecturers would do well to imitate.

The lamp of science, which has for some years burnt with considerable brilliancy in this pleasing melange, is now extinguished; and on closing the institution last Tuesday evening, Mr. Woodward delivered a very feeling and energetic address, in the sentiments of which we feel personally interested.—“The idea that this night the

doors of this institution will be finally closed," said Mr. W., "must be a matter of the deepest regret to all lovers of science: to me personally, because here I have formed friendships that I trust will last me as long as I have life; I would that I had the power to keep this Theatre of the Arts and Sciences still open; but if the valuable inventions of a Gurney—if the advantages so ably pointed out by a Jennings—if the delicate touch and melodious strains of a Crotch has failed to induce you to write a *de capo* in the books of the institution—I cannot hope to succeed when such ability and talent have been exerted in vain. It is for me only to regret that in the immediate vicinity of the metropolis of this great empire, an institution which has called forth so great talent, and elicited so much genius, should henceforth cease to promulgate knowledge, and disseminate a love of literature and science; but its name shall live and flourish, when its walls shall moulder to decay, and leave not a wreck behind."

Royal Academy of Sciences, Paris.

Nov. 11. M. Berzelius was elected Foreign Associate. Dr. Wollaston was the rival candidate; and M. Fourier was chosen Mathematical Secretary, in the room of the late M. Delambre.

Nov. 18. A memoir was read by M. Girard, on the Resistance of Cast Iron, whether used for conduit pipes or steam engine boilers. A discussion ensuing on the comparative advantages of high and low pressure steam-engines, MM. Laplace, Gay-Lussac, Girard, Ampere, and Dupin, were appointed a committee to make experiments on this interesting subject. The Messrs. Perriers have offered the use of their manufactory for this purpose. We anxiously await the report of these emi-

ment, persons as embodying the whole of the scientific and mechanical knowledge of our ingenious neighbours.

Nov. 25. Memoirs were read, on Tourmalines, by M. Brun-Neergard, and by M. Dutrochet on the direction taken by a magnetic needle placed on the circumference of a circle, which turns on its centre.

New Black Mineral.

A new mine of excellent black mineral, well calculated for paint, has been discovered near Biddeford, in Devonshire. Its colour is as deep as lamp-black, and the body equal to white lead,

Yeast.

THE following methods of making yeast for bread are both easy and expeditious:—Boil one pound of good flour, a quarter of a pound of brown sugar, and a little salt, in two gallons of water for one hour; when milk-warm, bottle it and cork it close: it will be fit for use in twenty-four hours. One pint of this will make 18lb. of bread.—To a pound of mashed potatoes (mealy ones are best) add two ounces of brown sugar, and two spoonful of common yeast; the potatoes first to be pulped through a cullender, and mixed with warm water to a proper consistence. Thus a pound of potatoes will make a quart of good yeast. Keep it moderately warm while fermenting.—This recipe is in substance from Dr. Hunter, who observes that yeast so made will keep well. No sugar is used by bakers, when adding the pulp of potatoes to their rising.—*Yorkshire Gazette.*

New Patents Sealed in 1823.

To William Gossage, of Leamington Priors, Warwickshire, chemist and druggist, for a portable alarm to be attached to and detached from clocks and watches; and which may be regulated to take effect at any given period of time—Sealed, 11th February.—2 months for enrolment.

To William Hope, of Tedburgh, in the county of Roxburgh, North Britain, iron-founder, for certain im-

provements in the construction of printing-presses.—Sealed, 18th March.—2 months for enrolment.

To George Emanuel Harpur and Benjamin Baylis, both of Weedon, in the county of Northampton, engineers, for an invention of a new method of impelling machinery.—Sealed, 18th March.—6 months for enrolment.

To Henry Habberly Price, of Neath Abbey, in the county of Glamorgan, engineer, for an apparatus for giving increased effect to paddles used in steam-vessels applicable to the rotatory movement by which they are generally worked.—Sealed, 18th of March.—6 months for enrolment.

To Thomas Rogers, of Buckingham Street, Strand, in the county of Middlesex, Esquire, for an improvement on stays or bodices, which improvement is also applicable to boots.—Sealed, 18th March.—6 months for enrolment.

To William Crighton and John Crighton, both of Manchester, in the County Palatine of Lancaster, machine-makers, for an improvement in the construction of the cylinders used in carding-engines and other machines employed in the preparation (for the spinning) of cotton, flax, wool, and silk, or mixtures of the said materials or substances.—Sealed, 18th March.—6 months for enrolment.

To William Bailey, of High Holborn, in the county of Middlesex, ironmonger, and Thomas Horne, the Younger, of Belmont Row, Birmingham, brass-founder, for improvements in the manufacture of metallic window frames, and other metallic mouldings, applicable to the ornamenting of furniture.—Sealed, 18th March.—6 months for enrolment.

Richard Badnall the Younger, of Leek, in the county Stafford, silk manufacturer, for an invention of certain improvements in the throwing, twisting, or spinning of sewing silks, Organzine, Bergam and such other descriptions of silk as the said improvement may be applicable to.—Sealed, 18th March.—6 months for enrolment.

D. H. M. S.		D. H. M. S.	
1 0 0 0	☾ illuminated 11 dig. on her western edge app. diam. 11"	12 18 31 0	☾ in conj. with ☽ long. 1s 18o 32'. Dif. dec. 4o 39' ☾ 22o 28' N. ☽ 17o 49' N.
1 12 49 0	☾ in quadrature with ☿	13 23 8 0	☾ in conj. with ♃ long. 2s 6o 6'. Dif. dec. 4o 36' ☾ 25o 29' N. ♃ 20o 53' N.
2 0 0 0	☾ in conj. with ♃ long. 9s 11o 30'. Dif. dec. 1o 37' ☾ 24o 55' S. ♃ 23o 18' S.	14 0 0 0	☾ in Perigee.
3 3 13 0	☾ in quadrature entering the last quarter.	16 0 0 0	☿ stat. long 9s 11o 33'.
4 8 48 10	♃'s 2nd Sat. will emerge from its shadow.	17 12 49 0	☾ First quarter.
5 0 0 0	☾ in its ascending node long. 1s 9o 32'	20 10 18 0	☾ enters ♃.
6 7 32 0	☾ in conj. with ♃ long. 0s. 0o 30'. Dif. dec. 6o 21' ☾ 4o 4' N. ♃ 2o 17' S.	23 0 0 0	☾ in conj. with ♃ long. 0s 25o 50' Dif. dec. 45' ♃ 8o 54' N. ♃ 9o 39' N.
7 12 1 0	☾ in conj. with ♃ long. 0s. 16o 37' Dif. dec. 5o 7' ☾ 10o 58' N. ♃ 5o 51' N.	24 18 57 0	Ecliptic opposition ☾ Full moon.
8 18 43 0	Ecliptic Conjunction ● New Moon	27 9 24 0	☿ will be occulted by the moon. α ♃ 11' 40' N. of moon's centre.
9 4 31 0	☾ in conj. with ♃ long. 1s 10o 15'. Dif. dec. 6o 37' ☾ 19o 36' N. ♃ 12o 59' N.	27 9 59 20	☿ will emerge from the moon. α ♃ 13' 15' N. of moon's centre.
10 8 54 42	♃'st 1st Sat. will emerge from its shadow.	28 20 27 0	☾ in super. conj. with ♃
		29 0 0 0	☾ in conj. with ♃ long. 1s 0o 40'. Dif. dec. 1o 38' ☾ 23o 3' N. ♃ 21o 25' N.
		30 0 0 0	☾ in Apogee.

N.B. All the above calculations are made to mean or clock time.
The waxing moon ☾—the waning moon ☾.

METEOROLOGICAL JOURNAL, MARCH, 1823.

1823.	Thermo.		Barometer.		Rain in inches.	1823.	Thermo.		Barometer.		Rain in inches.
	Higt.	Low.	+	-			Higt.	Low.	+	-	
FEB.						MAR.					
25	43o	30o	.	-,49	,3	11	48o	30o	+,26	.	,1
26	43	31	.	-,09	,125	12	48	31	+,16	.	.
27	40	35	+,20	.	.	13	54	43	+,02	.	.
28	42	30	+,20	.	.	14	53	43	+,10	-,02	.
MAR.						15	44	34	+,05	.	.
1	43	31	+,16	.	.	16	44	32	.	-,15	.
2	48	30	.	-,12	.	17	49	35	.	-,09	,05
3	51	37	.	-,22	.	18	51	36	.	-,20	.
4	45	36	.	-,01	,1	19	33	29	+,29	.	,15
5	44	35	+,18	.	.	20	45	33	.	-,27	.
6	41	29	+,08	.	.	21	52	40	.	-,07	,45
7	40	27	.	-,22	,1	22	54	41	+,19	.	.
8	41	29	.	-,48	.	23	51	36	+,39	.	,05
9	42	28	+,47	.	.	24	51	36	+,09	.	.
10	43	27	.	-,18	.	25	48	32	.	-,07	.

Lower Edmonton.

C. H. ADAMS.

Enigma, In the last Celestial Phenomena, 2nd column, 20th day, for ☾ enters ♃, read ☾ enters ♃.

LITERARY NOTICES.

Dr. Baron, of Gloucester, has undertaken to write the life of the late Dr. Jenner, and to arrange for the press all the manuscripts of that distinguished character. For these purposes all the documents in the possession of the family have been committed to his care.

Mr. T. Clark is about to publish a new System of Chemical Nomenclature, exhibiting not only the component parts of compound substances, but their precise proportions.

Mr. Bowdich is on the eve of publishing an interesting work on African Geography; containing a Sketch of the Portuguese Establishments in Congo, Angola and Benguela, with some account of their modern discoveries in the interior of Angola and Mozambique, with a map of the coast and interior.

An Encyclopedia, or General Dictionary of Music, in 2 vols, 4to, illustrated by engravings, is about to be published by Mr. Bacon, under the superintendence of Messrs. Clementi, Bishop, Shield, &c.

Letters upon the Art of Miniature Painting are preparing for publication, containing clear and progressive instruction, and the processes for attaining perfection in this beautiful art.

The Rev. G. Oliver is about to publish the Antiquities of Freemasonry, from the creation of the world to the dedication of Solomon's temple, and from thence to the present time.

A treatise on Mental Derangement, by Dr. Willis, is in the press.

Sir Everard Home, Bart. will shortly publish a third volume of Lectures on Comparative Anatomy.

Mr. Britton's Illustrations, graphic and literary, of Fonthill Abbey, are announced for publication early in April.

Dr. Pring has in the press an Exposition of the Principles of Pathology, and of the Treatment of Diseases.

Speedily will be published an Historical Essay upon the Art of Painting on Glass, from its earliest introduction into England by *Cimabue* to the present day.

FRANCE. The Memoirs of the celebrated and eccentric General Rap, first Aid-de-camp to Napoleon, written by himself, are preparing for publication in French and English.

M. Gau is going to publish, at Paris, 45 plates of Egyptian Antiquities, consisting of bas-reliefs and paintings, copied on the spot by himself.

RUSSIA. Count Romanzoff, who, at his own expence fitted out the expedition under Lieut. Kotzebue for circumnavigating the globe, has sent out travellers to cross the ice from the eastern coast of Asia to the western coast of America.

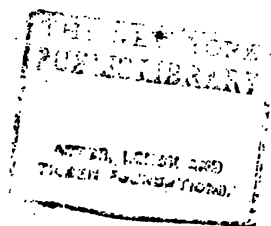
M. Hippins, a celebrated painter, has conceived the happy idea of publishing in twelve quarterly numbers, lithographic portraits of all the eminent statesmen, philosophers, and artists now living in Russia. The first two numbers have already appeared, and evince the progress of lithography in that half-civilized country.

EGYPT. The late Mr. Rich, the English consul at Bagdad, has drawn a plan of the ancient Nineveh, and discovered the ruins of the palace and gardens of Sardanapalus.

Ashes of Mount Vesuvius. Professor V. Pépé, of Naples, has analysed the ashes of this celebrated volcano, and the result of this extraordinary test is as follows, from ten ounces or 8,000 grains.

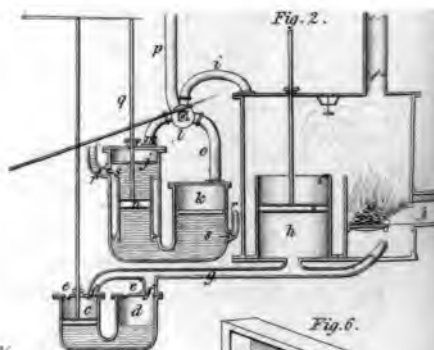
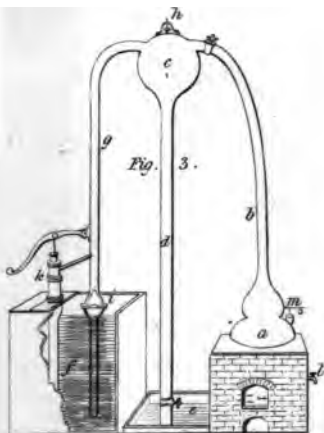
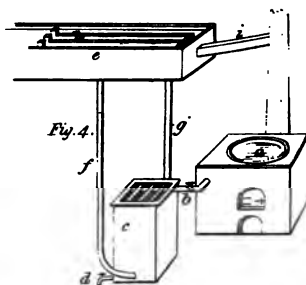
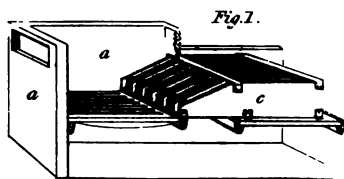
Sulphate of Potash	9½
— of Soda	44
— of Lime	57
— of Magnesia	16
— of Alumina	14
Hydrochlorate of Potash	9
— of Soda	31
Loss	5½
Oxide of Aluminium	1800
— of Calcium	300
— of Silicium	1200
— of Magnesium	300
Tutoxide of Iron	1800
Antimony	800
Gold	13½
Silver	6½
Loss	34
	8000

New Colouring Matter.—From a series of experiments made by M. J. L. Lapaigne, it appears that crabs, lobsters, &c. contain a red colouring principle, which may be extracted by means of alcohol; that it is not formed by the action of heat, but developed in the shell by the impulsion of that fluid; and that there exists in that species of animal, a highly coloured membrane, which appears to be the source of the colouring matter, which is insoluble in cold or boiling water, but soluble in sulphuric acid and ether.

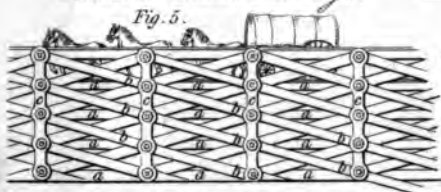


Arnotts Distilling Apparatus.

PLA

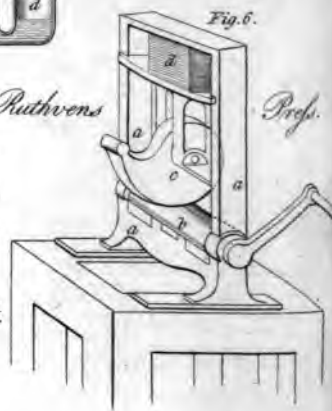


Smarts Chain Bridge.

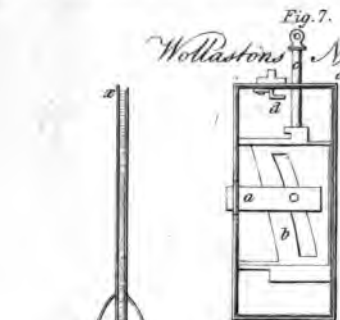


Ruthvens

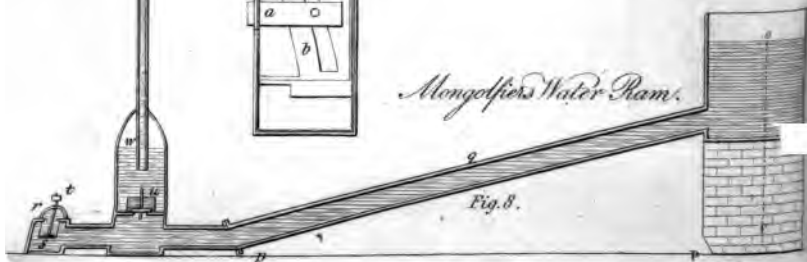
Profr.



Wollastons Night Bolt.



Mongolfiers Water Ram.



THE
London
JOURNAL OF ARTS AND SCIENCES.

No. XXIX.

Recent Patents.

To NEIL ARNOTT, of Bedford Square in the County of Middlesex, Doctor of Medicine, for his Invention of Improvements connected with the Production and Agency of Heat in Furnaces, Steam and Air Engines, Distilling, Evaporating, and Brewing Apparatus.

[Sealed, November 14, 1821.]

THESE Improvements are divided into four heads, and apply, first, to certain methods of consuming smoke, and thereby increasing the strength of the fire which generated it: secondly, to a mode of making fuel burn in condensed air, either for the purpose of producing an intense heat, or merely to heat the air itself, and thereby increase its elasticity, by which it may become a motive power applicable to the purpose of actuating machinery: thirdly, in making liquids boil, evaporate, or distil rapidly, at heats much below their ordinary boiling points, by removing or lessening the atmospheric pressure upon their

surfaces; and fourthly, in certain modes of cooling liquids in the process of brewing.

The consumption of smoke is effected by means of a peculiarly constructed apparatus, to be attached to the furnace, a perspective representation of which is shewn at Plate XI. Fig. 1: *a, a*, is the brickwork surrounding the furnace; *b*, the iron bars of the fire-grate; *c*, an iron box, divided into a number of channels, the ends of which are brought to that part of the furnace where the fuel lies in an ignited state. The coals, after being pounded or reduced into small particles, are introduced at the upper part of the box, *d*, and these slide down the inclined planes between the channels, into the furnace, being occasionally protruded forward by a forked scraper. The intervening channels, *e e e*, are for the passage of air to the interior of the furnace, by which contrivance a very great draught is kept up and the fire made to burn with extraordinary vigour. This apparatus is capable of being removed at pleasure, and may be easily adapted to furnaces already built. The fresh air constantly conducted into the furnace by this contrivance will mix with the smoke, drive it back into the fire, and thereby produce its perfect combustion, which will add considerably to the heat of the furnace, and by that means effect a saving in the consumption of fuel.

The second contrivance is a mode of enabling the fire of a furnace to burn in a condensed atmosphere; the object of which is to produce an intense heat, for the rarefaction and expansion of air to be employed as a motive force for working an air-engine, or any other purpose. To effect this object, the fire-grate is constructed as above described, but instead of being open, as shewn in fig. 1, it is designed to be enclosed within a large air-tight

vessel of cast iron, as shewn at fig. 2; in which *a* is the fire-grate; *b* the feeder, closed in by an air-tight door after the fire is lighted. In order to introduce air to the furnace, a blowing cylinder is employed as *c*, in which a piston is worked, either by hand, or by a connection with the moving part of an engine; this cylinder has communication with another cylinder, *d*, and the lower parts of both are occupied with water or other fluid; *e e*, are air-valves opening inwards to the cylinders *c* and *d*; *f f*, are discharge valves opening outward to the wind pipe, *g*. When the piston descends in the cylinder, *c*, the water rises in *d*, by which the air is admitted into the former and expelled from the latter. As this takes place alternately in the cylinders, *c* and *d*, a constant supply of wind is driven along the pipe, *g*, to the regulator, *h*, which is merely a cylinder with an air-tight piston rising by the pressure of the air and sinking by its own gravity. By this contrivance a steady uninterrupted blast is conveyed along the continuation of the pipe, *g*, to the fire, by passing through which it becomes heated and accumulates in an elastic state within the chamber above, whence it passes through the pipe, *i*, for the purpose of working the air-engine.

Two cylindrical vessels, *j* and *k*, having a communication at bottom, constitute the air-engine; their lower parts are occupied with water as the blowing cylinders, and upon the surface of this water are two floats. The heated air (raised to the temperature of five or six hundred degrees of Fahrenheit's thermometer,) passes from the chamber up the pipe, *i*, to the rotatory valve, *l*. This valve has the contrivance similar to other rotatory valves, of alternately opening a communication on one side, and closing the other, and is worked as usual by any of the ordinary

modes of connection to the crank, beam, or fly-wheel of the engine.

The heated air as described proceeding up the pipe, *i*, passes through the rotatory-valve to the induction-pipe, *m*, and thence to the cylinder, *j*; when by exerting its expansive force upon the surface of the water in *j*, drives a portion of the water into the cylinder, *k*; and as the piston, *n*, slides water tight up and down the cylinder, the descent of the water in *j*, depresses the piston. The rotatory-valve having now shut off the passage of the heated air to the cylinder, *j*, the passage is opened from the pipe, *i*, to the cylinder, *k*, through the induction pipe, *o*, and the air from *j*, is let off through the escape pipe, *p*. By these means the water is forced out of *k*, which causes it to rise in *j*, and carry the piston, *n*, up with it. Thus the alternating action of the piston is effected, producing a motive force which, by means of its rod, *q*, is communicated (as in the ordinary construction of steam-engines) to the beam, &c. for the purpose of actuating other machinery as well as of working its rotatory-valve and pumping apparatus above described.

It will be necessary to place floating boards upon the surface of the water in the cylinders *j* and *k*, upon the upper side of which the heated air will act, and these boards being bad conductors of heat, will prevent in a great measure the evaporation of the water; but as the water will become heated and consequently diminish, a contrivance is provided to supply the deficiency: *r, r*, are two pipes leading from a reservoir above, through which water flows; *s, s*, are two small levers connected to valves: when the water has so much decreased in quantity as to require replenishing, the floats on the surface will have descended, and by striking against

these levers, the required supply will flow into the cylinders. To prevent a vacuum in the cylinder or induction-pipes, two small valves are provided, opening inwards, which are held by slight springs, and act spontaneously whenever required.

As the temperature to which the air is heated will cause it to occupy a much greater space than in its natural state, only half the quantity that would fill the working cylinders is required to be pumped into the furnace and hot air chamber: and the velocity of the whole is regulated by a throttle-valve to be placed in the pipe, *m*, and operated upon by an ordinary governor. It is considered that in order to use this engine with effect, a glass eye-piece must be introduced in a convenient part of the air chamber, for the purpose of inspecting the state of the fire, and the poker for stirring the fuel when necessary must be introduced through an air-tight ball and socket joint.

The third part of the invention is designed to produce a vacuum on the surface of boiling liquids, to make them evaporate at low temperatures. For this purpose an apparatus similar to that shewn at fig. 3, is constructed, in which *a* is the boiler, containing the liquor to be operated upon, the head being connected by the pipe, *b*, to a condenser, *c*, all of which are made sufficiently strong to resist a pressure of more than fifteen pounds on every square inch of surface. This condenser must be placed at a height exceeding thirty-two feet from the ground, or from the bottom of a well, in order to admit of the metal pipe, *d*, extending from its lower side descending that distance; *e*, is a cistern or reservoir of water, into which the lower end of the pipe, *d*, is immersed. Another cistern, *f*, is also employed, placed at the distance of about sixteen feet below the underside of the condenser, from which a pipe, *g*, rises

up to the condenser. A valve opening upwards is placed on the top of the condenser, at *h*, and also in the pipe, *g*, at *i*. A forcing pump, *k*, is placed in the reservoir, *f*, by which water is injected into the pipe, *g*, above the valve.

The manner of using this apparatus will be as follows: The boiler, *a*, being filled with the liquid, and other materials for decoction, the stop-cock, at top of the pipe, *b*, and also that at the bottom of the pipe, *d*, must be closed; the condenser, *c*, is then to be filled with water from the reservoir, *f*, after which the cock at bottom of the pipe, *d*, must be opened, and the water allowed to run out of the condenser, when it will sink in the pipe to the altitude of thirty-two feet, and will leave the condenser in nearly an exhausted state. Heat being now applied under the boiler, and the cock of the pipe, *b*, being opened, a communication will be formed between the condenser and the boiler, and any air in the boiler will pass over to the condenser. A second operation of filling the condenser with water, and permitting the water to descend as before, will now leave the boiler in a state of vacuum, and the two pipes, *g* and *d*, being connected, will act as a syphon, the cold water rising through the pipe, *g*, to the condenser, and running off by the pipe, *d*, with a velocity that may be regulated by the stop-cock at bottom.

According to the state of exhaustion produced in the boiler and condenser, the fluid will boil at a higher or lower degree of temperature, and which at all times will be below the boiling point of the same fluid in the open air. Should air by any means enter the condenser, the vacuum must be reproduced as before, and by occasional repetition of the operation, a vacuum may be maintained on the surface of the fluid in the boiler, for any required time. A cock, *t*, is inserted in the lower part of the boiler, for the purpose of drawing off the fluid contained

within, when it has been sufficiently operated upon by the fire; and a safety-valve is inserted at *m*, to prevent accidents. The valve, *h*, on the top of the condenser, opens upwards, to permit the escape of air, when the water is first introduced, and is intended also as a safety-valve in the event of any sudden evolution of steam.

The fourth head of this invention consists of a refrigerating apparatus, for the purpose of cooling liquors in the process of brewing, a representation of which is given at fig. 4: *a*, is the boiler, from the lower part of which a pipe, *b*, extends to the refrigerator, *c*. This refrigerator consists of a case, containing a series of very shallow oblong boxes, formed of copper-plates tinned: the thinner the metal composing them the better, provided that a sufficient substance is retained to prevent the sides from expanding or collapsing. These boxes are placed side by side, and connected together by pipes at top, leading from the hot liquor pipe, *b*, and also at bottom by a discharge-pipe, *d*; the external case is made water-tight, and being filled the water surrounds all the boxes. On turning the cock of the pipe, *b*, the hot liquor from the boiler immediately flows through the refrigerating tubes or boxes, which being surrounded by the cold water, reduces the temperature of the liquor, and it runs off through the pipe, *d*, in a cooled state. The entrance pipe, *b*, and exit, *d*, must be furnished with cocks for regulating the quantity of fluid, which it may be found eligible to pass through the refrigerator in a given time.

An open reservoir of water is placed above the refrigerator, as at *e*, from which a pipe, *f*, descends, and conveys the cold water down to the refrigerator; another pipe, *g*, rises from the refrigerator to the reservoir, and as the water in the refrigerator imbibes heat from the hot liquor passing through it, the specific gravity becomes re-

duced, and the heated water flows up the pipe, *g*, to the reservoir, while the cold water, specifically heavier, descends through the pipe, *f*, and thus keeps up a perpetual current of cold water through the refrigerator as long as any hot fluid flows through the tubes or boxes within. But, whenever circumstances will not admit of the reservoir of cold water being placed above, then it will be necessary to raise the water by pumping. In situations where a large reservoir may be objectionable, it is proposed to introduce a series of flat pipe, just beneath the surface of the water, as *h*, one end of each being left open, and turning upwards to the atmosphere; the other ends communicating with a pipe, *i*, leading into the chimney. By these means the heat of the water as it arises, and the draught of the chimney combined, will cause a current of cold air to pass through the flat pipes, which will have a very powerful effect in cooling the water.

For the purpose of condensing the vapours from a still, the refrigerator, and other apparatus last described, may be employed, and in that case the steam or vapour is to be admitted at the pipe *b*; but as the process of distillation is proposed to be carried on in vacuum, the discharge pipe, *d*, must descend perpendicularly, for about thirty-five feet. In order to produce the first vacuum, the interior of the flat tubes or boxes are to be filled with water, which is permitted to run off; or it may be drawn off by a pump or exhausting syringe, placed in some convenient part.

“ In describing the several parts of my aforesaid invention and improvements, I have particularly avoided the statement of dimensions, unless when they were absolutely necessary to the action of the same, because such dimensions and proportions must vary with the circumstances under which the same may be performed and

constructed; and in the description of the air-engine, evaporating apparatus, and refrigerator, I have also been general as to form, because my invention does not consist in the particular forms or proportions of the matters and things described, but in the general combination and arrangement of pistons, cylinders, tubes, valves, and other well known mechanical agents for the production of new and beneficial purposes, to which such things have not been so employed before, or at any time in so efficient and beneficial a manner; and I accordingly claim the arrangements and appropriations herein-before described to be made, and the inventions and improvements alluded to in the herein-before in part recited Patent."

Inrolled, May, 1822.

To GEORGE SMART, of Pedlar's Acre, Lambeth, in the County of Surrey, Civil Engineer, for an Improvement in the Manufacture of Chains, which he denominates Mathematical Chains. [Sealed, 4th July, 1822.]

THESE chains, intended for the construction of bridges, are proposed to be made of straight bars, with connecting bolts, forming a combination of angular braces, supporting each other in such a manner that they cannot be much altered from a straight line by any weights that may be placed above. By this contrivance there will be no lateral force against, or tension upon, the abutments, as is usual in the present mode of constructing bridges of arches or of chains; the piers or abutments which may support a bridge formed by this improved construction of chain having no other resistance to maintain than the weight of the materials composing the bridge, and the carriages or other things which may pass over it.

pure fixed vegetable alkali is preferred for rendering timber incombustible; into which solution the planks of wood are to be introduced and suffered to remain until the alkaline solution has penetrated completely through the wood, which generally takes place in a few weeks; a weak solution, however, will answer the purpose of rendering the wood incombustible. To every hundred weight of alkali twenty-five gallons of water are to be added, but the strength of the solution may be varied according to circumstances.

In order to render the scenes of theatres, floors of rooms, or any other woodwork, incombustible, they are washed over in every part five or six times with a strong solution of alkali by means of a brush, observing that the articles should be suffered to dry between each wash. By these operations the pores of the timber will become saturated with the alkali, and prevent any accident from fire; but for ship timbers, or any description of timbers to be used on a large scale, the trees are proposed to be saturated with alkali as soon as fallen, and before they are barked, which is to be done by means of an engine to extract or force out the sap, then the whole may be saturated by forcing in the alkali through the pores. The tree may then be barked, and sawed up into planks as occasion may require. A vessel already built may be washed and saturated with a strong alkaline solution, which will render it perfectly incombustible; "so that ships, at a very small expence, may be preserved from the possibility of being injured by fire, either accidentally or intentionally."

For rendering articles of wearing apparel incombustible, a weak solution of the vegetable alkali in the purest state it can be obtained is to be employed; and as alkali produced from some vegetables is much stronger than others, the mode proposed is to add alkali to the water

until cotton, paper, or linen, after being dipped into it and dried, will not blaze. Articles, when thus treated, will char by intense heat, but not inflame.

The solution employed for this purpose should stand for a week or more after making, to allow all its impurities to subside, and should then be drawn off into a clean earthen vessel, after which it is to remain "for a month or six weeks corked up in a heat nearly sufficient to produce evaporation, occasionally trying its purity by putting a portion of it into a clear flint glass bottle, holding about a pint, in order to ascertain by its clearness when it is fit for use. Before it is quite clear and proper for use, there will generally appear in it very thin transparent laminæ floating about, which will gradually sink to the bottom, leaving the solution as clear as the purest water, so as not to discolour the finest linen; it is then in a fit state to draw off into clean vessels for use."

The articles to be rendered incombustible, as cloths, curtains, &c. after being washed and wrung, are then to be dipped in the solution and wrung out again as dry as possible; then, after drying, they may be ironed or mangled in the usual manner.

The inventor observes:—"In my patent I claim the exclusive privilege for the application of the fixed alkalies in a mixture or preparation which will prevent the danger of accidents by fire; but I here wish to remark, that while I render timbers incombustible, by extracting the sap and saturating or filling up the pores with alkali, such timbers are not only rendered incombustible, but are also preserved from the dry rot, as no timber so preserved will be affected by dry rot. To the navy and all public buildings this is most important.

"There are thus three great principles in the application of my discovery, of which I claim the exclusive pri-

vilege. First, the application of the fixed alkaline solution in preventing all accidents from fire to calicoes, cottons, silks, muslins, cloths, and linen of every description, and bed or window curtains, and sailcloth;—secondly, its application to prevent effectually wood work of all sorts, either in buildings or vessels of any description, from being destroyed by fire, either by accident or intention;—and, thirdly, the process used to render timber incombustible, will at the same time completely prevent the dry rot from even affecting such timber so prepared under my patent.”

Inrolled, October, 1822.

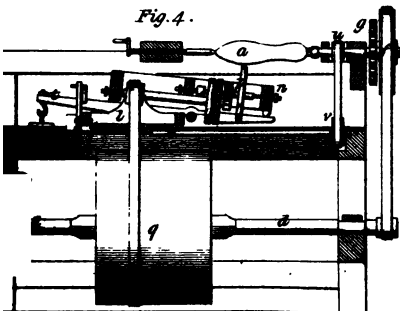
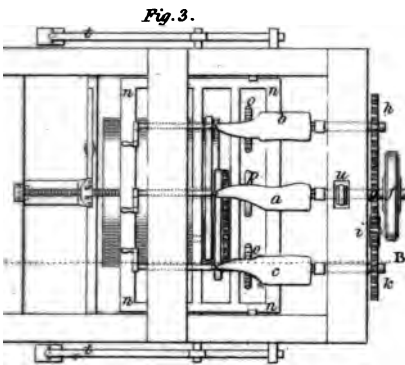
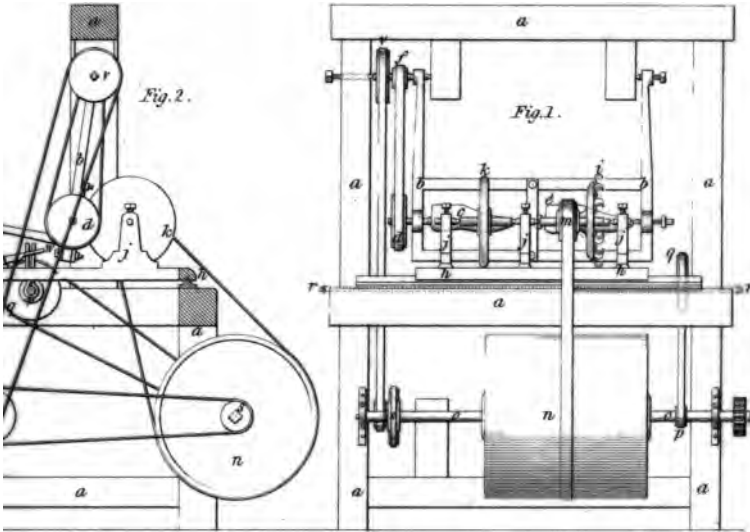
To JOHN WILLIAM BUCKLE, of Mark Lane, in the City of London, Merchant; for the Invention of certain Improvements in Machinery, for Shaping or Cutting out irregular forms in Wood, or other Materials, or Substances which admit of being cut by Cutters, or Tools, revolving with a circular motion, whether such motion be continuous, or reciprocating; which Invention was communicated to him by JOHN PARKER BOYD, of Boston, in the United States of America.

[Sealed, 2nd March, 1822.]

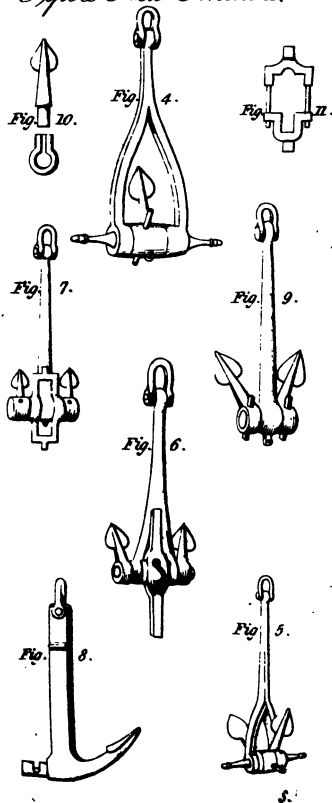
THIS invention is a peculiar construction of lathe, by which gun-stocks, lasts for shoe makers, and a variety of other irregular forms in wood, are produced without the operation of manual labour. Its general features bear a strong resemblance to some parts of the block-making machinery invented by Mr. Brunel, and employed at Portsmouth dock-yard.

Plate XII. fig. 1, is a front view of this machine and

Buckles Lathes for producing irregular forms.



Pipers New Anchors.



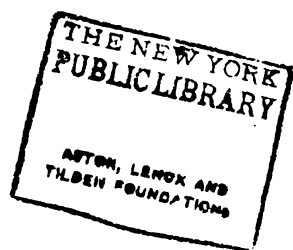


fig. 2, a cross section, in which *a a*, is the wooden frame-work, and *b b*, the iron frame of the lathe swinging on pivots above; the lower part of this frame is divided into two compartments, one of which is to contain the model of the form intended to be produced, (as a shoe-maker's last,) and the other, the rough block of wood, out of which a last is to be formed, agreeable to the shape and dimensions of the pattern. The model or pattern last is to be placed in the lathe, as *c*, between two pivots, the outer pivot having a band wheel, *d*, upon its axle, and the rough block is also placed in a similar way between two pivots, as *e*. The rotatory motion is communicated by a band, from the rigger *f*, to the wheel *d*, by which the axle is made to revolve, and with it the pattern last is carried round, by means of claws in the end of the axle; the claws also at the ends of the centre pivot take hold of the model on one side the centre bar, and of the block on the other, by which contrivance, the band-wheel of the lathe, the model, and the rough block revolve together.

A carriage, *h h*, which slides laterally upon angular ribs, supports a rotatory cutter, *i*, and a tappet, *k*, which are respectively held between concentric pivots, in the bearings, *j j j*. The cutter, *i*, is a wheel carrying a series of knives of a hooked shape. The rotation of the cutter is effected by means of a pulley, *m*, upon its axle, which is driven by a band from the large drum-wheel, *n*, below.

Upon the axle, *o o*, of the drum-wheel there is a pulley, *p*, from whence a band leads to another pulley, *q*, which is fixed upon an axle, *r r*, shewn by dots, extending across the back part of the machine, and turning on pivots, let into the end rails of the frame. A part of this axle has a male screw thread upon it, and a nut with a female screw attached to the sliding frame acts

upon the male screw of this axle; by this contrivance as the pulley, *q*, causes the axle to revolve, the nut moves the sliding frame, upon its angular ribs, with a slow progressive motion, by which means the tappet, *k*, is carried along the model, *c*, and the cutter, *i*, along the block, *e*, from end to end. The nut or female screw is made in two parts, which are held together by levers, *w*, like a pair of pincers, and when the nut is required to relinquish its hold of the screw, for the purpose of carrying the sliding frame back again, the pincers are opened, and the nut disengaged from the screw of the axle.

The revolution of the drum-wheel may be produced by a winch applied to its axle, *o o*, or by any power communicated to the toothed-wheel, from a steam-engine water-wheel, or other moving agent which actuates the machinery, in the following manner :—Upon the axle, *o*, of the drum-wheel, there is a pulley, *s*, from which a band extends to a wheel, *t*, in the back part of the frame; and from a pulley fixed on the side of this wheel a band is carried up to the wheel, *v*, upon the axle of the rigger, *f*: Thus the rotatory motion of the drum, *n*, is communicated to the rigger, *f*, which turns the arbour, *d*, of the lathe, carrying the model of the last and the block, about to be formed, in the manner above described; and at the same time the band from the drum, *n*, leading to the pulley, *m*, turns the cutter, *i*.

Now as the lathe swinging in its frame, *b b*, upon the pivots above, hangs out of it perpendicular, the rough block, *e*, will fall against the rotatory cutter, *i*, (by the pressure of the weighted lever,) which as it revolves chips off the superfluous parts of the wood; at the same time the block revolves also, in order to bring all sides of its surface in contact with the cutter; but the shape of the article about to be produced must depend upon the

advancing and receding of the block from the cutter. This then is regulated by the tappet, *k*, the periphery of which as the model, *c*, revolves, acts against its surface, and at whatever distance any point upon the varying surface of the model is from its axis, to the same distance the cutter will approach the corresponding point of the block, from its axis; hence, by the unequal surface of the model running against the tappet, the swinging-lathe is made to advance and recede, and the cutter consequently forms the periphery of the block, to the exact curve of the model, *c*, which is running against the tappet, *k*; the continuation of the irregular figures lengthways arises from the slow progressive lateral motion of the tappet and cutter, which are carried forward by the nut and screw upon the axle, *r*, as above described; the tappet as it advances acting against every part of the surface of the model, and by that means continually removing the swinging-lathe to such distances, as shall cause the cutter to produce the exact fac-simile, whatever be the shape of the model placed in the lathe.

Another modification of these principles is proposed, by which a pair of lasts, answering to the right and left feet, may be formed at one operation of the machine, and from one pattern, or model, which model may be adapted indifferently to the right or left foot: fig. 3, is a horizontal representation or plan of this machine, and fig. 4, a vertical section of the same, cut through at the dotted line, A. B. fig. 3: *a*, is the pattern last; *b*, and *c*, the two blocks formed into lasts by the operations of the machine. The model last, *a*, and also the blocks, *b* and *c*, are held at their ends between forked axles, which pass through the upper rails of the frame. The main axle, or shaft, *d d*, is turned by means of the winch and toothed wheel, *e*, which takes into a pinion,

upon the end of the shaft, *d*, or it may be actuated by any other first mover. A band from a pulley at the other end of the shaft, *d*, leads up to the rigger, *f*, which is affixed to the axle or outer pivot of the model, *a*, and by that means causes it to revolve. Upon the same axle also a toothed wheel, *g*, is affixed, which by its revolution turns the corresponding toothed wheel, *h*, affixed to the axle of the block, *b*, and thereby causes the block to turn, but in an opposite direction to the model: a pinion, *i*, which takes into the wheel, *g*, turns the toothed wheel, *k*, in the same direction as the model, and by this connection the revolution of the toothed-wheel, *g*, causes the model and the two blocks to turn simultaneously.

A carriage, *l*, which slides laterally upon the frame, *m m*, supports the pivots of the vibrating frame, *n n*; this frame holds two rotatory cutters, *o o*, and the tappet, *p*, and operates exactly in the same manner as the swinging-lathe, fig. 1 and 2. A band from the drum-wheel, *q*, below passes over the pulley, *r*, in the vibrating frame, from the axle of which other bands extend to small pullies, and turn the cutters, *o o*, and the tappet, *p*. In this modification of the machine, the frame carrying the cutters and tappet is pressed upwards by means of the weighted levers, *t t*, and hence the tappet running against the unequal surface of the model or pattern last, as it revolves, causes the rotatory cutters to approach to, or recede from the axis of the blocks as they revolve, and thereby form the blocks exactly to the same dimensions and figure as the model. The traversing of the carriage, by which the tappet and cutters are carried along the last and blocks from end to end, is effected by means of a small pulley, *u*, upon the axle of the spindle, *a g f*, from which a band extends round the pulley, *v*, upon the screwed-shaft, *w*, and as the shaft, *w*, turns, it acts in a nut or screw box, *x*, connected to the carriage, and thereby

causes the carriage, with its tappet and cutters, to slide forward, with a slow progressive motion.

By similar modifications of these principles, machines may be made to produce, two, three, four or more lasts, or other forms in wood at one operation, from a single pattern or model. In some cases it may be found desirable to give the cutters a vibratory motion instead of a rotatory one, under which circumstances it will be necessary to make cutting edges upon both sides of the hooked knives, by which means they will be enabled to cut the wood as they vibrate in both directions. This movement may be effected by having a long crank upon the main axle, in place of the great drum-wheel, *q*, above described, and a connecting-rod extending therefrom to an arm or lever upon the axle, and in place of the pulley, *r*, the connecting rod being at liberty to slide upon the crank in a similar manner to the sliding of the strap on the drum, which accommodates itself to the situation of the sliding-carriage.

The Patentee states " I do not make claim to the invention of cutters, wheels, screws, pullies, or any other parts separately ; but only as combined and applied in the manner hereinbefore described, to produce machinery capable of cutting out, or shaping objects or articles, of an irregular form in wood, or other materials, or substances which admit of being cut by cutters or tools, revolving with a circular motion, whether such motion be continuous or reciprocating ; by which machinery I am enabled to produce any required number of objects or articles from one model or pattern, and at one continued operation, or at once fixing in the machine ; for I hereby declare, that I do not make claim to those machines which are capable of imitating or cutting a portion only of the surface of any irregular formed object or article,

without refixing the said article in the machine, to complete or cut the other parts of the surface, but I confine my claim to the combination of parts and machinery, which shapes or produces at one continued operation a fac-simile of any particular model or pattern, which model or pattern has been previously prepared and fixed in the machine, and also for making a reverse of the said model or pattern, as hereinbefore described, for the right or left shoe last."

"The form and proportion of the various parts of the machine may be varied according to the size or shape of the objects or articles intended to be produced in the machine, or according to the discretion of the workman, as well as the materials of which the same may be made."

Inrolled, May, 1822.

To JOHN RUTHVEN, of Edinburgh, Printer, for a Method of procuring a Mechanical Power.

[Sealed 2d March, 1822.]

THIS invention is principally applicable to a press for packing goods, or pressing them into a small compass; the power of which is effected by the revolution of two solid bodies upon their axles, the one concentric, the other excentric; or in other words, the one being a cylindrical roller, the other a snail roller. Plate. XI. fig. 6, represents the press, and the mode by which the mechanical power is produced; *a a*, is the frame work supporting the rollers; *b*, the cylinder revolving upon its pivots and turned by a winch, or spur-wheel and pinion; *c*, the excentric or snail roller, also upon pivots, the periphery of which runs against the periphery of the cylinder;

a, is a bundle of paper, a bale of goods, or other articles intended to be compressed in bulk. By the revolution of the cylinder, *b*, the snail, *c*, is carried round, and the pressure produced upward against the under side of the bale, its force being at all times proportioned to the increasing radius of the snail, or excentric roller, which acts as a wedge, and with the least possible friction.

The patentee states, that as this mechanical power is produced by the revolution of two moving bodies, the axes of which are parallel to each other, the periphery of the snail may be formed by one curve, increasing from its least to its greatest radius; or by two opposite curves, which form is commonly called a double snail.

The peripheries of the cylinder and snail may be toothed or fluted in the direction of their axes, they may be made of any suitable metal or other material, and their powers may be employed in various ways and for divers purposes.

Inrolled, June, 1822.

To HENRY SEPTIMUS HYDE WOLLASTON, of Clapton, in the County of Middlesex, Merchant, for a Bolt, or Fastening, particularly applicable as a Night Bolt.

[Sealed June 4th, 1822.]

THIS contrivance is a bolt, or tongue, contained in a box, to be attached to the side of a door post, which bolt may be projected or withdrawn by means of a line or wire passing over pulleys, or by means of cranks, like the ordinary mode of hanging bells. The internal construction of this fastening is shewn in Plate. XI. fig. 7; *a*, is

the bolt or tongue, sliding horizontally, in which a pin, or stud, is fixed for the purpose of acting in the diagonal groove of the weight, *b* ; a line or wire is attached to the eye of a rod, *c*, by which the weight, *b*, is raised, its own gravity causing it to descend when left, and at liberty. It will now be seen, that as the pin or stud, which projects from the side of the bolt, acts in the diagonal groove of the weight, the rising and falling of the weight will cause the bolt to advance or recede.

A small slider, *d*, is introduced in the top of the box, for the purpose of being slidden into a little notch, in the weight, *b*, when the bolt has been drawn in and may be required to remain so, or a balance weight may be attached to the reverse end of the line or wire, by which the weight, *b*, can be held up if required, and the bolt remain drawn back.

Inrolled, August, 1822.

To WILLIAM PIPER, of Cookley Iron Works, in the Parish of Wolverley, and County of Worcester, Civil Engineer, for his Invention of several new Anchors for the Use of Shipping and other Vessels.

[Sealed, 1st November, 1822.]

SEVERAL new forms and constructions of anchors are proposed under this patent, by the adoption of which great advantages as to strength are anticipated over every other form or construction of anchor hitherto made. The particular object of the Patentee is to preserve such a disposition of the fibres of the metal as shall afford the

greatest possible strength ; in doing which the crossing or bending of the fibres at the junctions of the shank, flukes, and crown, where great strength is required, must be avoided as much as possible, so that the fibres may not be disturbed or injured.

“ In this respect all anchors at present made are defective ; for, in connecting the shanks to the crown pieces, the grain of the metal is either crossed, or so much curved, as to strain the fibre, and consequently induce a weakness where the greatest strength is required. And further, the very considerable thicknesses of metal which are to be brought into immediate contact by means of the hammer in forging anchors upon the old construction, renders it highly probable that faulty places may be left within the mass, though externally imperceptible. These considerations have induced me to construct anchors as much as possible free from similar defects ; and the leading principle in my new anchors is, that the grain of the metal shall run nearly straight in all the parts where strength is particularly required.”

Plate XII. fig. 4, shows an anchor with one tumbling fluke, which passes through the forked or branched part of the shank. The lower part of this anchor answering to the crown, has a spindle through it, upon which the fluke turns, and a pin is there introduced for the purpose of confining the fluke when in a holding position. This shank is formed of a solid piece of wrought iron, the fibres of which run straight, and at the crown holes are pierced, which merely bulge the metal without bending the fibres round so as to strain them. The arm and fluke also is formed of one piece punched through without curling or crossing the fibre, and the spindle which holds the arm to the crown is likewise straight. This spindle extends some distance on each

side of the anchor, and is intended to answer the purpose of a stock; for when either of the ends of the spindle comes in contact with the ground, the anchor will be thrown over into a holding position; or an iron stock may be introduced near the shackle instead of these projecting ends. In the descent of the anchor, the fluke will fall over towards that side which is nearest the ground, and will there be ready to take hold when the anchor is drawn forward.

Fig. 5, is another anchor upon the same principle, but slightly varied in form from the last. In this the forked part of the shank is closer than in the former, and there are two arms or flukes connected to the crown piece, one of which falls into its holding position as the anchor comes to the ground, and is held at its proper angle by the other fluke stopping against the shank.

Fig. 6, represents another variation in the form of these improved anchors, having two tumbling flukes, which are both intended to take hold of the ground at the same time; the shank is here, as before, made without crossing the grain of the iron, and the eyes for admitting the bolt at the crown and at the shackle are punched out of the solid; not formed by welding or turning the iron round. In this form a guard is introduced at the crown, to answer the purpose of a stock, by turning the flukes over into a holding position. The arms and flukes are made, as before described, of the straight grain of the iron punched through, and the flukes are fixed to the spindle which passes through the crown-piece.

Fig. 7, has a shank without any fork, but formed straight throughout; the guard here is an elongated frame of iron, for the same purpose as a stock, and is, with the tumbling flukes, fastened to the spindle which passes

through the crown of the anchor, and causes the flukes to fall into their holding position.

Fig. 8, is an anchor of the old construction, one of the arms being broken off; to this broken arm of an old anchor, as here shewn, it is proposed to attach an arm and fluke, in the manner seen at Fig. 9, the action of which arms may be limited either by a chain passing from them, and round the shank, or by pins passing through the crown, as before described. Fig. 10, is a mode of adapting the broken arm and fluke of an old anchor to the purpose last described; and Fig. 11 shews a guard which may be attached to, or passed through the crown of anchors, as Fig. 7.

“ The principles of my new anchors I consider to consist in shanks which are made of straight lengths of metal; and finished so that the fibres of the iron shall not be injured by cross shuts or uncertain welding; also each arm and palm is made in one solid piece, and finished in straight lines, so that the fibres will not be altered, and the shaft-pin or spindle will also be in one straight line; and this is the improvement which I hereby claim. My anchors being made in separate pieces, gives a great advantage to the workman to execute each part perfect, for by these means he will not have such heavy weights to lift when hot, which will render my anchors much stronger, with less weight, and if any accident should happen to the anchor, (which all anchors are liable to) any part may be taken separate from the other to be repaired, and several of those parts of the anchor which may be likely to break may be carried on board in case of accident. My anchor is also so contrived that one of thirty hundred weight may be taken to pieces, and put together again by one man in twenty minutes; it may also be taken to pieces, and stowed in any part of the ship, in

as little room as straight bars of iron, and put together again in ten minutes in its usual form."

Inrolled, January, 1823.

Original Communications.

To the Editor of the London Journal of Arts, &c.

SIR,

As the pages of your useful Journal appear to be open to philosophical discussion, permit me to propose through that medium an enquiry into a subject, which not only claims a most important place in the various walks of science, but is professed to be more or less understood by every individual, from the prince to the peasant; I allude to a theory of the weather. An opinion prevails among people even of the best information, that at the change of the moon changes of the weather are to be expected. I cannot suppose that in these enlightened days, any thing like astrological influence is admitted, but presume that as the moon is known to exert a gravitating power upon the waters of the ocean, and thereby produce tides on our shores, it is supposed that similar laws affect the atmosphere, and cause the changes of wet and dry.

Presuming that this were the case, (which, however, I am not intending to admit,) those effects arising from the gravitating influence of the moon would be regular, and wet and dry would succeed each other with the same certainty that we experience the changes of day and night. The opinion, however, which I am combating, and on which I really solicit information, is so generally believed by all classes, that perhaps it would be nearly as difficult to

eradicate the notion as to implant a new theological creed. I shall, therefore, propose this simple question: *What philosophical reason can be given that changes in the weather should take place at the times that the MOON CHANGES, in preference to any other periods during her monthly revolution?*

It may be necessary to add some few observations as to the phenomenon of a lunation, in order to shew that the changes of the moon are really nonentities. The moon revolves round the earth in about twenty-nine days, during which circuit she not only places herself, as respects us and the sun, in the different positions of conjunction, opposition and quadrature, but presents us with a greater or less portion of her enlightened hemisphere, according to her age or progress of advancement. These positions produce a progressively increasing or decreasing effect in the gravitating power of the moon upon our waters, but the periods of change are nothing more than the precise moment at which the moon has turned the whole of her dark side towards us, and is about to begin another lunation, or new moon; the moment at which she presents the whole of her enlightened surface to us, or full moon; and the moment at which the exact half of her enlightened surface is visible to us, as at the beginning of her first and third quarter.

From hence it will be seen, that the effect of the moon's influence, whatever it may be upon our earth, its waters, and atmosphere, is *progressive*; and, therefore, no hypothesis can, I think, be founded upon principles less compatible with reason than the supposition that the phenomenon of the CHANGES of the MOON should have any effect in producing a sudden change in the weather, or that the atmosphere should be operated upon by any peculiar influence, at the periods at which these changes take place.

I have endeavoured, with no small assiduity, to learn from

persons of the best information, something like a principle out of which these ideas may have arisen, but without effect; and I can find no other argument in defence of the hypothesis, than "that which is the opinion of every one must be founded in truth." If, through the medium of your widely circulating Journal, these observations should induce a spirit of enquiry, I hope that your pages will still be open to the suggestion of any plausible theorist, as much valuable information is sometimes elicited in the discussion of disputed topics, of which the profound philosopher may in silence feel himself satisfied.

I am, Sir, yours,

A CONSTANT READER.

To the Editor of the London Journal of Arts, &c.

SIR,

HAVING observed in a recent number of your Journal, that sugar has been found to be a preservative against the putrefaction of fish, I have been induced to try its effect for myself, not being at all times disposed to agree with the sentiment of Shakespeare's clown, "I like a story in print, because then I know it's true." In order to make the experiment, I procured two soles from our market, which had been brought through London, and consequently were then at least two days out of water, and far from fresh. I had them skinned, and having mixed a tea-spoon full of common moist brown sugar with an equal quantity of table salt, rubbed the fish on both sides with this mixture. They were then set in the pantry, where they remained two days longer. After this they were washed, and appeared perfectly fresh, and when cooked in the ordinary manner proved as sweet as any fish I ever tasted.

I am induced to request your insertion of these remarks, from a conviction of the great importance of this process in the preservation of animal food in general ; and I earnestly solicit the attention of your readers to the subject, not only as a useful piece of knowledge in domestic economy, but as affording a simple means in every one's power of preserving meats of all kind perfectly sweet, without imbibing any flavour different from fresh-killed meats in their most perfect state. This process would, perhaps, be extremely valuable in preserving that delightful fish mackerel, which can scarcely be brought to market in the inland towns, before putrefaction has begun to act upon them.

I am, Sir, yours, &c.

C. GYDE.

Painswick, Gloucestershire.

P.S. An artist of my acquaintance learned in Italy, that water-colours mixed with a solution of refined sugar, instead of gum water, never fade, and I have seen many examples of this on paper, vellum, and ivory ; might not the same material be found efficacious in fixing some of the vegetable colours in dying ? I intend making some experiments on this subject, and shall, perhaps, communicate the results to you in a future paper.

To the Editor of the London Journal of Arts, &c.

SIR,

I have read in your very interesting Journal of Arts and Sciences, several accounts of a new method of conducting the electric fluid clear of ships, by a Mr. W. S. Harris, and that his method has lately been exemplified on the Louisa and Caledonian men of war at Plymouth, and also on a

vessel on the Thames. His method "is by means of a copper conductor fixed in the masts through the bottom of the ships," and to be continued until the copper come in contact with the water.

It gives me great satisfaction to see, that this most excellent preventative from damage from the electric fluid, is likely to be adopted in the navy, as I am confident it will derive immense advantage from the use of electric rods, by the perfect security they will give to all vessels protected by them. I have no doubt but Mr. Harris supposes that he is the first inventor, for I cannot for a moment suppose that had he read my papers in Nicholson's *Journal of Natural Philosophy and Chemistry*, Vol. 29, page 305, and Vol. 31, page 108, but that he would have acknowledged that the idea of attaching copper or metal rods to vessels, to protect them from lightning, belongs to me. Situated as I am in the centre of the kingdom, I had no means of getting them adopted: I could only give the idea to the world, hoping that some persons in the navy might read it, who had influence, or felt it their interest to adopt them. I beg to refer you to my papers, to shew what were my ideas respecting electric rods for houses as well as ships, and would wish particularly to call the attention of your readers to my papers on this subject; nor do I think they would be uninteresting to a very numerous class of your readers, if you were to republish some extracts from them, especially as we have of late witnessed so many accidents from lightning, which might have been prevented had my method of attaching electric rods to buildings, &c. been adopted.

I am, Sir, your obedient Servant,

B. Cook.

Birmingham, April 8.

We shall attend to the subject above-mentioned, and probably, in our next, make some extracts from Nicholson's Journal, which we are unable to do at present.—ED.

Reviews of New Publications.

An Epitome of the Elementary Principles of Natural and Experimental Philosophy, Part the First. By JOHN MILLINGTON, Professor of Mechanics in the Royal Institution, 8vo. pp. 358, with Fourteen Lithographic Plates, being the substance of a Course of Lectures on those Subjects.

THE general features of this work cannot be expected to possess much novelty ; it is of the same cast as several that have gone before it, though certainly this embraces many inventions in mechanics introduced of late years, and which have not before appeared in any elementary treatise. It would be impossible for us to do justice to the work, in the very partial notice of its contents to which our limits confine us ; we, therefore, shall only remark in general, that the subjects are clear, familiar, and lucid, partaking much of that neatness of expression and perspicuity of description by which Mr. Millington's lectures are distinguished. Upon the rise and progress of the steam-engine he has been particularly luminous, and here we can hardly admit his title, an *epitome*.

The best illustration, however, of the character of this work will be an extract, and this we have selected, because it describes an invention which deserves to be better known.

“ The *Water Ram*, or *Belier Hydraulique*, as it is

called by its inventor, M. Mongolfier, of Paris, is a highly useful and simple machine, for the purpose of raising water without the expenditure or aid of any other force, than that which is produced by the momentum or moving force of a part of the water that is to be raised; and whether its invention arose from accident, or were the result of reasoning, it is one of the most simple and truly philosophical machines that hydraulics can boast. The effect of this machine depends entirely upon momentum, or the new quantity of force that is generated whenever a body is put into motion, and the effect of this is so great, as to give the apparatus the appearance of acting in defiance to the established laws of hydrostatic equilibrium; for a moving column of water of small height is made to overcome, and move another column much higher than itself. An operation very similar in effect to the water ram, and which may serve to explain it, is met with in every house in which a supply of water is furnished from a considerably elevated cistern, to an apartment below by means of a descending pipe ending with a cock; both the cock and pipe may be amply strong enough to resist the pressure of the water while in a state of rest; but on opening the cock to permit the water to flow, and then suddenly closing it, the additional power acquired by such motion will become apparent from the noise and concussion that occurs, which never fails to shake the pipe so as to be sensibly felt, and will even burst it open, if the head of water is sufficiently elevated. This circumstance, it is said, gave rise to the discovery of the water ram, the form and construction of which is shewn at Plate XI. Fig. 8. Suppose *o* to represent a cistern or reservoir, or the source of a spring which is constantly overflowing and running to waste, by means of a channel a few feet lower than itself as at the level line *p p*. Instead of per-

mitting the water to run over the sides of *o*, let it be conducted to the level *pp*, by means of iron or other pipes *q*, connected with the side of the reservoir, and terminating by an orifice *r*, in which a conical or other valve *s*, is placed, so as to be capable of effectually closing the pipe when such valve is drawn upwards: *t* is an adjustable weight fixed on to the spindle of the valve *s*, by means of which the valve is kept down and open; any water, therefore, that is in the cistern *o*, will flow down the pipe *q*, and escape at the orifice *r*, so long as the valve remains down, but the instant it is raised and shut, all motion of the water is suspended. Thus situated, the adjustment of the weight *t* must take place, and by adding or subtracting from it, it must be made just so heavy as to be capable of sinking or forcing its way downwards, against the upward pressure of the water, the force of which will depend upon the perpendicular distance from the surface of the water in *o*, to its point of discharge at *r*; consequently if the valve *t* be raised by the hand or otherwise, all motion of the water in the pipe *q* will cease, but the instant the valve is released, it will fall down and permit the water to escape. The water, by moving, acquires momentum and new force, and consequently is no longer equal to the column to which the valve has been adjusted, but is superior to it, by which it is enabled to overpower the resistance of the weight *t*, and it carries the valve up with it, and closes the orifice *r*. This is no sooner done, than the water is constrained to become stationary again, by which the momentum is lost, and the valve and weight once more become superior, and fall, thus re opening the orifice and permitting the water to move again, and as the pressure of the water and the weight of the valve each become alternately superior, the valve is kept in a constant state of vibration, or of opening and shutting

without any external aid whatever. Such is the principle upon which the motion of the water in the pipe q is produced, but the momentum generated cannot be instantly annihilated, and it is not only of sufficient power to raise the valve s , but likewise to burst open the lower end of the pipe q , unless a sufficient vent be provided by which this accumulated force can escape. Accordingly a second valve u is placed near the lower end of these pipes, and is made to open upwards into an air vessel w with a discharging pipe x , arranged as before described in speaking of the force pumps, and consequently whenever the valve s , is closed, the water which otherwise would have flowed from the orifice r , now opens the valve u , and enters the air vessel, until the spring of the contained air overcome the gradually decreasing force of the momentum, when the valve u closes, and that at s opens to permit the water to make a second blow or pulsation, and in this way the action of the machine continues unceasingly, without any external aid, so long as it is supplied with water and remains in repair. A small running stream is necessary for this machine, as the water at o should be kept at one constant elevation to insure the perfection of its action. A much greater quantity of water likewise escapes at the orifice r , between the pulsations, than can be raised in the delivering pipe x , particularly if it extend to any considerable height, for the comparative quantity of water discharged through x , and permitted to run to waste at r , must always depend upon the respective perpendicular heights of the pressing column $o v$, and the delivered or resisting column $w x$, and the rapidity of the pulsations, will likewise depend on the same circumstances. A very insignificant pressing column $o v$, is capable of raising a very high ascending column $w x$, so that a sufficient fall of water may be ob-

tained in almost every running brook, by damming up the upper end to produce the reservoir *o*, and carrying the pipe *q* down the natural channel of the stream, until a sufficient fall be obtained, for the greater the length of the descending pipe from *o* to *r*, the more certain will be the effect of the machine, since if the column *q* is not of sufficient length, its water will be thrown back into the reservoir instead of entering the air vessel. The author has constructed several of these machines with great satisfaction in different parts of England, and in order to show their efficacy, subjoins the following particulars of one which has been in constant use for about 2 years.—The reservoir *o* is a basin of about 10 feet square and 2 feet deep, formed partly in limestone rock and partly in brick-work, the supply of water being from a natural spring. The pipe *q* is of cast iron, 14 yards long, and 2 inches diameter. The piece at the end, containing the valves and air vessel, is about 15 inches long. The valves 1 inch and a half in diameter each, and made of brass. Contents of the air vessel about 1 gallon, the height from the surface of the water at *o*, to its point of discharge at *r*, is 6 feet 4 inches, measured perpendicularly. The delivering pipe *x* is of lead, 1 inch diameter, and proceeds horizontally under ground for about 104 feet, and then rises perpendicularly to the height of 54 feet 3 inches above the discharging valve at *r*, where it delivers the water into a large cistern. The water is thus raised 47 feet 11 inches above the surface of the spring that supplies it, and this by a fall of only 6 feet 4 inches. So circumstanced, the valve *s* makes 50 vibrations or opens 50 times in a minute, when it loses about 2 quarts of water, and injects nearly a quarter of a pint into the elevated cistern at each pulsation, the water lost being to that raised very nearly as 17 to 1. This may appear a small quantity of

water, but when it is recollected that the machine is constantly at work by night and by day, (unless purposely stopped,) and furnishes 6 quarts of water every minute, this will be found to be a supply adequate to a very large household establishment.

“ In another instance, a machine of similar dimensions furnished 7 quarts per minute, to a reservoir at 28 feet 6 inches above the water ram, the fall in the pipe *q* being 6 feet.

“ This simple and elegant machine has been long known in England, though but little used. Mr. Matthew Boulton, of Soho, near Birmingham, obtained a patent for it in 1797, and a water ram of considerable dimensions was constructed at the same time, for supplying his house with water. The machine was, however, not found to answer as at first constructed, or indeed as above described, because from the mutual incorporation that takes place between air and water, the successive quantities of water that were impelled into the air vessel, absorbed the whole of the air which it contained, and it became quite filled with water, and ceased to afford that elasticity which is indispensable to the working of the machine. This was also discovered by M. Mongolfier in France, who, in 1816, obtained an English patent for his improvement of this machine, by introducing a very small snifting valve, opening inwards into the lower part of the air-vessel, but kept shut by a small spring. This valve is self-acting, and effectually prevents the escape of any air or water from the air-vessel; but when the water is thrown back by the shutting of the valve *s*, it produces an instantaneous vacuum at the extreme end of the pipe *q*, upon which the snifting valve opens, and admits of a sufficient quantity of the external air into the air vessel, to keep it constantly replenished; and by this simple addition,

is the water ram rendered continuous in its action. Unfortunately for M. Mongolfier his English patent is an unavailing one, since he had permitted all the particulars of his improvements to be published in the *Annales des Arts, &c.* in France, and the account was translated and presented to the British public in one of our periodical Journals, above three years before he attempted to obtain his exclusive privilege. The same defect exists in all pumps and engines to which an air vessel is applied, particularly when the air is subjected to great pressure; and, therefore, a small orifice capable of being closed or adjusted by a cock or screw valve, should be made in the suction or feeding pipe of every forcing pump that is connected with an air vessel, in order to enable the pump to draw in and deliver as much air into the air vessel, as will exactly counteract the absorption; and which will readily be determined by experiment."

Nobel Inventions.

Perkins's Steam-Engine.

THE very important facts which have developed themselves, during the progress of Mr. Perkins's experiments on steam, have induced him to divide his improvements and discoveries into three distinct patents, the first of which will be specified in June. We are, therefore, still prevented from giving a detailed account of the engine and its construction, but shall take the earliest opportunity of laying before our readers, such information relative to this interesting subject as circumstances will permit.

Mr. Perkins's attention has, for some weeks past, been devoted to a consideration of the best mode of applying his inventions to the different constructions of low pressure steam-engines already erected; and we are authorised to say, that from experiments of the most unquestionable accuracy, he is enabled to effect a saving in the consumption of fuel, in ordinary engines, equal to *eight parts out of nine*.

New Material for Tanning.

A MATERIAL has lately been imported from New South Wales, which is extracted from a tree growing in that country, something in appearance like our English ash. The extract is about the colour and consistency of coal tar, is of a powerful astringent quality, and has been found by several tanners who have tried it, to possess the tanning property equal to oak bark, and to perform its office in about the same time. The discovery of this material is expected to be of very considerable importance; not only in opening a new source of commerce with our rising colony, which is every way desirable, but as furnishing the tanning matter in a more convenient form than by the employment of bark, as in the new material no residue like the spent bark will be left to be removed from the pit, and the tanning matter may be diluted with water, as circumstances may require.

Four or five large casks of the material have been landed by way of specimen; but we are precluded from giving at present any further account of the mode of its preparation, as the invention is now under the consideration of government, and if not thrown open as an article of general commerce, will shortly become the subject of a patent.

Sea Elephants' Oil from New South Wales.

A GROUP of small islands were discovered to the southward of Van Dieman's Land, on the shores of which a very large species of seal, called the sea elephant, has been found; these animals have afforded a very large supply of oil, which, on examining, proves to be capable of burning in lamps, and of producing gas equal to the whale oil of the South Seas. John Rain, Esq. of Great Coram Street, London, has imported 400 tons of this oil; and in consequence of the addition thus made to the articles of export from the colony of New South Wales, which increases the trade and multiplies the resources of the mother country, the Society of Arts have presented this gentleman with their large Silver Medal.

Polytechnic and Scientific Intelligence.

Proceedings of the ROYAL SOCIETY.

Feb. 27.

THE reading of Dr. Scudamore's paper, on the question as to the evolution of heat during the coagulation of the blood, was resumed and concluded. Dr. S. had made experiments, from which he compared the successive temperatures of the coagulating blood with those of a solution of starch in water, while cooling; and also with pure water under similar circumstances; and he inferred that a slight evolution of heat does occur during coagulation, commencing when the fibrin begins to concrete, but continuing throughout; whilst in some instances the temperature rose one degree.

A paper was also read at this meeting, on the double organs of generation in the lamprey, conger eel, common eel, and barnacle, which impregnate themselves, and in the earth worms; the individuals of which class mutually impregnate each other. By Sir Everard Home, Bart. V. P. R. S.

The learned and ingenious author has ascertained recently, and at former periods, that the teredines, lamprey, and conger and common eel, are hermaphrodites. He was inclined to the opinion of Sir Humphrey Davy, that the last mentioned animals are the same species, differing in size and colour merely from the circumstance of one living in salt water, and the other in fresh. An experiment is now being made, in Cornwall, by Sir Humphrey Davy, to decide the fact; young eels it has been found, soon die in salt water, but an old one did not appear to sustain any inconvenience, and had begun to turn green.

The paper also gave a particular account of the double organs of generation of the animals mentioned in the title, and of their mode of copulation; the whole illustrated by a series of microscopical drawings, by Messrs. Bauer and Clift.

March 6.—A paper was read on a new Phenomenon of Electro-magnetism, by Sir H. Davy, Bart. P. R. S. Several experiments are described in this communication, of which the following are the most interesting:—On immersing the two wires of an electrical battery in mercury and presenting a magnet to them, either above or below, it was found that the mercury was made to revolve round the wires. The next was, that two copper-wires, one-sixth of an inch in diameter, and carefully polished at the extremities, were passed perpendicularly through the bottom of a glass basin; and by wax made non-conductors, except at their extremities. Mercury

was then poured in, to the height of one-tenth or one-twelfth of an inch above the wires, and on connecting them with the battery, it was thrown into violent motion, and raised, over the wires, into conical elevations of one-tenth of an inch, from which waves flowed in all directions. Upon bringing a magnet over the wires, these elevations were depressed, the circular motion ceased, and currents were produced in the mercury in opposite directions; and upon the nearer approach of the magnet, the elevations were converted into vortical depression. Sir Humphrey would not enter into the conjectural part of the subject, further than to state, that the experiments were unfavourable to the idea that these phenomena were produced by the motions of a single fluid; and that they seemed to be produced by a fluid, moving either in right lines or in undulations, from each wire as a centre. He concluded by observing, that we owe to Dr. Wollaston the first suggestion of electro-magnetic rotation; and had not an experiment failed, from an accident which happened to the apparatus, that gentleman would have been the discoverer of the phenomena.

March 13.—A paper was read on Fluid Chlorine, by M. Faraday, Esq. communicated by Sir H. Davy, Bart. P. R. S.

The details of this paper are too long to give in their present shape, and if abridged, would be unintelligible. A note has been annexed by the President, in which he states, that he was induced by Mr. Faraday's experiments, to think that other gases beside chlorine, might be reduced to a liquid state by the pressure of their own atmospheres, when evolving from substances containing them; this opinion was confirmed by a variety of experiments, which he detailed at considerable length.

Royal Society of Music.

The first elections on the foundation of this new and promising Institution have taken place; twenty pupils of both sexes have been chosen.

Horticultural Society.

JAN. 7, 1823.—A paper was read by the President, on the flat peach of China, imported by the Society in 1820. It appears to be a hardy and vigorous fruit, for, on Jan. 3d, the peaches were as large as peas, with no more heat than would just exclude the frost.

Jan. 21.—A paper, by J. R. Gowen, Esq. was read, descriptive of a new beautiful amaryllis, which had flowered in the stove at Highclere; and a paper by D. Powell, Esq. on an easy method of securing the scion to the stock in grafting. Two papers on the cultivation of the mushroom, and one on that of the English cranberry, were also read.

Feb. 4.—Papers were read, on the management of cauliflowers, so as to preserve them through the winter; on that of fig-trees in the open air; and on the effects of frost upon glazing; and on forcing strawberries.

Feb. 18.—Papers were read, on treating potatoes, so as to preserve them fresh during the winter; on a variety of brassica oleracea fimbriata, called Woburn perennial cabbage; and on the fertilization of the female blossoms of filberts—to remedy the infertility of which, the Rev. G. Swayne, the writer, suspended branches of wild hazel over the filbert plants, with complete success.

March 4.—Papers were read, on the cultivation of melons in the open air; on that of the tetragonia expansa, or new Zealand spinach; and on the seedling varieties of amaryllis.

A large collection of fruits, preserved in spirits, were exhibited; they had been collected at St. Thomas's, Africa, Maranham, and Trinidad.

Artists' Anatomical Society.

On Tuesday, March 11, Sir Anthony Carlisle delivered a lecture at this institution, on the nature and motion of the bones and muscles of the human body, and on the intimate and necessary connection of anatomy with the fine arts.

Linnæan Society.

March 4.—Two papers were read. A description of the skeleton head of the Long-snouted Alligator of the Ganges, or *Lucerta Gangetica* of Linnæus, presented to the Society, with the entire skeleton of a young one, by Major General Hardwicke, F. R. S.; and a description of a Serpent hitherto supposed of the Genus *Boa*, and the *Boa Phrygia* of Shaw.

March 18.—The following papers were read by the Rev. L. Guilding, F. R. S. Observations on the generic character of *Locusta*, with the description of a remarkable species.—The natural history of *Phasma Ramulus*.—Observations on the Genus *Asalaphus*, with the description of a new species; and on the nature of the Marine Production commonly called *Flustra Arenosa*; by John Hogg, Esq. F. R. S.

Description of the Tailed Bat, by Major General Hardwicke.

Description of *Fuvertea Agavephylla*, the Agave *Cubensis* of Linnæus; by M. F. d'Avelear Protero, Professor of Botany in the University of Countra, Portugal.

On the generic and specific characters of the *Chrysan-*

themum Indicum of Linnæus, and of the Plants called Chinese Chrysanthemums, by Joseph Sabine, F. R. S., L. S. &c.

Geological Society.

January 3.—Communications were read, on the Beds of Limestone and Clay of the Ironsand of Sussex, by Gideon Mantell, Esq. M.G.S., and C. Lyells, Esq. M.G.S.

A Notice illustrative of the Strata of the Seven Rakes' Mine, near Matlock, Derbyshire; by Charles Daubeny, M.D. F.R.S. Professor of Chemistry in the University of Oxford. This paper describes the qualities, dimensions, and connections of the strata of limestone and toadstone, and the different minerals which they contain, and concludes with comprehensive observations on the phenomena which they present. Dr. D. is of opinion, that it would be difficult to reconcile the facts which he has observed, with the theory which ascribes the formation of the toadstone to an igneous origin.

Feb. 21.—The President communicated two Letters by Joseph Byerly, Esq. on the Geology of Sierra Leone; the principal rocks of which are described to be porphyry, basalt, and sienite.

A paper was commenced, on the Geography and Geology of Lake Huron, in North America, including a Description of new Species of Organic Remains, by John Bigsley, M.D.

March 7.—The foregoing paper was concluded: it is illustrated by a Map of the Lake, and Plates of the Organic Remains which abound in the Limestone Rocks.

March 21.—The Rev. W. D. Conybeare communicated a paper, entitled Observations on the Belemnite, by J. S. Miller, Esq. Mr. M. considers the Belemnite to have been an animal of the Cephalopodous division of the

Mollusca, inhabiting a fibrous spathose conical shell, divided into chambers, connected by a siphunculus, and beyond which shell extended a kind of protecting sheath. The internal radiated texture is referred to its original organic structure, and not to any subsequent crystallization. An enumeration and description of the various species of Belemnites, accompanied by plates illustrative of their form and structure, is subjoined.

London Medical Society.

The Fifteenth Anniversary of the Medical Society of London was recently held at the London Coffee House. Dr. Uwins in the Chair. Mr. Grainger delivered the Annual Oration, which was on "Injuries of the Head, particularly Concussions of the Brain."

Astronomical Society.

March 14.—The following papers were read:—On the determination of the Resultant of the Forces or Pressures applied to a Point of Matter, by means of a Functional Equation, by Dr. Meikleham, Professor of Natural Philosophy in the University of Glasgow.

A comparison of Observations made at Dublin with those of Greenwich, on the Parallax of certain Fixed Stars, by Dr. Brinkley, Professor of Astronomy, Trinity College, Dublin.

Many valuable presents of books have been received in aid of the Library about to be formed by this popular and admirable institution.

Asiatic Society of London.

Considerable progress has been made in the institution of a Society under this title, for the encouragement of Literature, Science, and the Arts, in connexion with India,

and other countries eastward of the Cape of Good Hope. Among the objects of the Society will be the promotion of researches into the arts, literature, and history of Asia; as well as the dissemination of various branches of European knowledge and science among the inhabitants of that vast continent; labours, which may, at no distant period, be followed up by some intelligent natives of the East, animated by the spirit of improvement which has already begun to manifest itself among them.

Antiquarian Society.

April 23d, being St. George's Day, the Fellows of this Society met at their apartments in Somerset Place, in pursuance of their Statutes and Charter of Incorporation, to elect a President, Council, and Officers for the year ensuing. Eleven of the old Council and ten other Members of the Society were chosen of the new Council. The Officers were—the Earl of Aberdeen, President; T. Amyot, Esq. Treasurer; T. Combe, Esq. Director; and N. Carlisle and H. Ellis, Esqrs. Secretaries. The Society afterwards dined together at the Freemasons' Tavern, according to annual custom.

The Academy of Medicine, in Paris, Surgery department, offers a gold medal, of the value of 1000 francs, for the best solution of the question, "To determine, by observation, experience, and reason, what is the preferable Mode in the Treatment of Wounds penetrating the Breast." The Treatise to be written in Latin or French, and delivered before the 1st of June, 1824.

The Royal Academy of Sciences, at Lyons, has offered a prize of 300 francs for the best Essay on the following subject:—To shew, by experiments, if the violet ray of the solar spectrum possess the virtue of communicating

magnetism to a steel needle ; and if this virtue belong to it, to the exclusion of the other coloured rays. Memoires are to be sent to MM. Mollet and Dumas, Lyons, before July, 1823.

The election of a foreign associate, of the French Institute, in the room of the late Dr. Jenner, took place at Paris on March 31st, when our ingenious and scientific countryman, Dr. Wollaston, was elected by an immense majority.

A Philosophical Society has been instituted at York, more especially for the cultivation of geology. Several valuable mineral specimens have been presented to it; among which is a meteoric stone that fell at Juvenus, June 21, 1821, by M. Humboldt, the celebrated Russian traveller and naturalist.

The Literary and Philosophical Society, recently established in Sheffield, was opened by a Lecture on the Progress of Literature, from the earliest periods to the close of the thirteenth century, delivered by M. Montgomery.

AFRICA.—Captain Laing, of the Royal African Light Infantry, has just returned from a mission of discovery in the Soolima Loosoo country, hitherto unvisited by any European. It possesses peculiar geographical interest as the source of the mysterious river Niger. We understand that Capt. L. has ascertained its origin to be in the hill of Soma, and collected a variety of other interesting information.

RUSSIA.—Professor Nevi, of St. Petersburg, has been employed by the Emperor of Russia to make researches in Tártary, and to examine the course of the Oxus. The expedition will extend as far as the Lake Saisan.

From an official statement recently published, it ap-

pears, that in the year 1820 there were in the whole Russian Empire—

Births	-	-	-	1,570,399
Deaths	-	-	-	917,680

Excess of Births - 652,719

Admiral Krusenstern has been engaged for many years upon a set of Charts of the South Sea, containing thirty Charts, which will shortly be published at the expence of the Emperor of Russia.

Mr. Babbage is diligently pursuing his curious investigation, on the application of machinery to the calculating and printing of mathematical tables; and we understand that the results of his labours are *satisfactory in the highest degree*.

Organic Remains.—The skeleton of a rhinoceros was recently discovered by some miners ninety feet below the surface of the earth, in the neighbourhood of Wirksworth, Derbyshire. The bones are in a perfect state, and even the enamel of the teeth uninjured. They have been shewn to Professor Buckland.

Casting of Stereotype Plates.

M. Didot, the celebrated French printer, practises a new method of casting Stereotype Plates. Moveable types composed of seven parts of lead, two of regulus of antimony, and one of a mixture of nine parts of tin, and one of copper, are composed into a page in the usual way, and by means of a strong press, forced down into a plate of pure lead, which thus becomes a solid matrix. In this matrix as many stereotype forms may be cast as can be wanted.

Economical Bridge.

A Bridge of Suspension has been constructed near Annonay, Department de l'Ardèche, France, upon the fol-

lowing simple plan. A band of eight iron wires, each $\frac{1}{2}$ of an inch in diameter, is carried across the river, backward and forward, four times, and made fast at each side to iron bolts in the rock. Cross pieces of wood are attached from one side of the band to the other, at intervals, across, and on these are placed planks (parallel to the wires,) which form the foot way. Two other bands of wire are carried across at a convenient height as hand rails; and to prevent lateral motion, the bridge is made fast at the middle to some large stones in the bed of the river. Though of so light a structure, it is so steady and strong that not the least bend is perceived in passing over it. It is 2 feet broad, and 55 feet long; and the whole expense of constructing it was but about 50 francs, (scarcely two guineas.)

Feeding of Engine Boilers.

A saving of 25 per cent, in fuel for this purpose has been effected in the following manner:—Instead of letting in a continual supply of water, equal to the portion consumed in steam, the engineer of the Glasgow Water Company took an opportunity when the engine stopped, as at meal-time, night, &c. to introduce water into the boiler to as much as 18 inches above its usual level, so that when the labour was resumed there was abundant hot water, steam ready, and no increased fuel necessary to heat freshly introduced water.

New Surgical Instrument.

M. Reynauld, a physician at Grenoble, has invented an instrument by which the operation of lithotomy, or cutting for the stone, can be performed in two minutes.

Parachute Rocket.

A newly invented rocket has been lately tried at Chat-ham. After rising a considerable height in the air it ex-

plodes, and a parachute is discharged, with a fire ball attached to it, which gives sufficient light to illuminate the country for a mile round: and as the parachute expands it prevents the ball from falling. This rocket is intended to show the position and movements of an *enemy's army* during the night.

Powerful Magnet.

Professor Paterson, of Philadelphia, lately exhibited an artificial magnet of the horse-shoe form, which supported the enormous weight of 162 lbs. or more than five times its own weight, which is only 32 lbs. It is said to be the most powerful magnet ever known, and was prepared by Mr. Lukins, who is said to have discovered a method of *touching* much superior to that used in Europe. The magnet is deposited in the Philadelphia Museum.

Boring for Water.

The use of this invention appears to be rapidly extending. It has been practised with striking success in several parts of the county of Kent. At King's Ferry a hole has been bored to the depth of 170 feet, and a pipe three inches in diameter inserted, which stands two feet above the surface, and has a curved top; from this pipe water has continued to flow at the rate of five gallons per minute. The expense was 35l. At Elmly Ferry the same beneficial results are experienced.

Soldering Iron.

Sheet iron may be soldered by filings of soft cast iron, applied in the usual way of soldering with borax, which has been gradually dried in a crucible and powdered, and a solution of sal ammoniac.

Prevention of Dry Rot.

Dr. M'Culloch recommends the application of a cheap odorous oil, in the way of paint, as a means of preventing the operation of that active cause of destruction in ships and timber in general, the dry rot.

British Indigo.

A discovery is said to have recently been made, which, if true, promises the most important consequences in a commercial and agricultural point of view. It is stated that the common hollyhock, or rose mallow, which has been cultivated with the view of converting it into hemp or flax, yields a beautiful blue dye, equal in every respect to the best Indigo. We should be glad to have this confirmed.

British Opium.

Messrs. Cowley and Staines, of Winslow, Bucks, have cultivated poppies from opium, with such success, as to induce a belief that that branch of agriculture is worthy of support as a matter of national importance. At an expense of £11. 11s. 2½d. they procured 60 lbs. of solid opium equal to the best from Turkey, and worth 80s. per lb. from rather less than four acres and a half of ground. The poppy seed was expected to produce upwards of seventy gallons of oil; the oil cake would feed cattle, and the poppy straw make excellent manure: 50,000 lbs. of opium is annually consumed in this country, and which could easily be raised in Great Britain. It would require 4,000 or 5,000 acres of land, and employ from 40 to 50,000 people.

A new method of taking altitudes at sea, when the horizon is invisible, has been invented by Mr. Adams, rector of the Inverness Academy. In consequence of an application to the Admiralty for an opportunity to try this method on

board one of his Majesty's ships, the Cherokee brig of war, was ordered on this service, and on the 22d of January, sailed from Inverness with Mr. Adam on board. On passing down the Beaulieu Frith, the sun being invisible, Mr. Adam easily succeeded in determining the vertical angles contained between the horizon and the tops of the adjacent mountains, seen at different distances from the ship; and at night, while the horizon was invisible, he took altitudes of the moon, so as to distinguish single minutes in her varying altitudes. Capt. Keats and the officers of the Cherokee expressed a very favourable opinion of the success of this method at sea, when the motion of the ship is not considerable, and anticipated that on land it might supersede the use of an artificial horizon.

A newspaper states that a letter from Cape Coast, dated 30th November, mentions a Tartar merchant having succeeded with incredible labour and difficulty in completing a journey through the heart of Africa, which must excite great interest amongst geographers. He commenced his undertaking at Tripoli, and passed over land to Alexandria; from this point his difficulties increased. He crossed the desert to Angela, Zula, and Mozook, Bournon, and Knackna, crossed the Niger at Gana to Nykee, Zeppoo, and Moosseedoo; again crossed the Niger at Jennee; from thence to Timbuctoo, and worked his way over the Hong mountains to Diambella, in the Mundinga country, towards Sierra Leone; he visited the Ashantee capital, and pursued his journey from thence to Cape Coast. The sufferings undergone by this enterprising traveller exceed almost belief; in the journey over the desert, the whole of his merchandize was necessarily relinquished by the loss of his camels, and he was reduced to the extremity of distress; however, his genius and courage did not desert him, for he

hit upon the ingenious device of manufacturing and selling a colouring for the eye-brows, which took wonderfully, and placed him in comparative affluence. The account given by this merchant, corresponds with the descriptions we have of the known parts of Africa in this traveller's route, and there is no doubt entertained here of the veracity of his journal.

New Patents Sealed in 1823.

To James Frost, of Finchley, Middlesex, builder, for certain improvements in the process of calcining and preparing calcareous and other substances, for the purpose of forming cements.—Sealed 3d April.—6 months for enrolment.

To Christopher Pope, of Bristol, spelter-maker and metal-merchant, for a composition of certain metals, to be used for the purpose of sheathing the bottoms of ships and vessels, and of roofing the tops of houses, or for any other purpose for which such composition may be applicable.—Sealed, 8th April.—2 months for enrolment.

To John Martin Hanchett, of Blackfriars, in the city of London, Companion of the most Honourable Order of the Bath, for certain improvements in propelling boats and vessels.—Sealed, 12th April.—6 months for enrolment.

To Daniel Wade Acraman, of Bristol, iron-manufacturer, and William Piper, of the Corkley Iron Works, Worcester, iron-manufacturer, for certain improvements in the preparation of iron, for the better manufacture of chains and chain cables.—Sealed, 12th April.—2 months for enrolment.

To Gerard Graulhié, of Castle Street, Holborn, Gentleman, for communications made to him by certain foreigners, residing abroad, of a machine or apparatus, upon a new and portable construction, capable of being inclined in different degrees, adapted to the conveyance of persons and goods over water or ravines, for military or other objects, and applicable also to purposes of recreation and exercise.—Sealed, 16th April.—6 months for enrolment.

To Joseph Johnson, of Waterloo-bridge Wharf, Middlesex, for certain improvements on drags to be used for carriages.—Sealed, 16th April.—6 months for enrolment.

To Francis Deakin, of Birmingham, Warwick, wire-drawer, for an improved method of manufacturing furniture for, and an improvement to, the mounting of umbrellas and parasols.—Sealed, 22d April.—6 months for enrolment.

To Francis Gybbon Spilsbury, of Walsall, Stafford, for certain improvements in tanning.—Sealed, 22d April.—6 months for enrolment.

To Robert John Tyers, of Piccadilly, Middlesex, fruiterer, for a machine or apparatus to be attached to boots, shoes, or other covering of the feet, for the purposes of travelling or pleasure.—Sealed, 22d April.—6 months for enrolment.

To James Rawlins, of Penton Place, Pentonville, Middlesex, Gentleman, for a bedstead machine or apparatus for the relief of invalids.—Sealed, 22d April.—6th months for enrolment.

To William Palmer, of Lothbury, City of London, paper-hanger, for certain improvements in machinery, for the purpose of printing or staining paper for paper-hangings.—Sealed, 22d April.—4 months for enrolment.

D. H. M. S.		D. H. M. S.	
1 0 0 0	♂ in its ascending node long. 1° 12' 49'	10 4 20 0	♂ in conj. with ♀ long. 2° 3' 49'. Dif. dec. 2° 26' ♀ 25° 1' N. ♀ 23° 35' N.
2 21 45 0	♂ in quadrature entering the last quarter.	11 17 26 0	♂ in conj. with ♀ long. 2° 12' 29'. Dif. dec. 4° 9' ♀ 23° 28' N. ♀ 21° 49' N.
4 4 57 0	♂ in conj. with ♀ long. 1° 10' 30' Dif. dec. 1° 11' ♀ 15° 2' N. ♀ 13° 51' N.	12 0 0 0	♂ in Perigee.
6 6 37 10	♂'s 2nd Sat. will emerge from its shadow.	12 14 1 0	♂ in conj. with ♀ long. 2° 25' 5'. Dif. dec. 1° 16' ♀ 26° 15' N. ♀ 24° 59' N.
8 0 0 0	♀ illuminated 10 dig. on her western edge app. diam. 12''	16 19 23 0	♂ First quarter.
9 0 0 0	♀ in perihelion.	21 10 35 0	♂ enters II.
9 10 26 0	♂ in conj. with ♀ long. 1° 8' 3' Dif. dec. 5° 10' ♀ 19° 4' N. ♀ 13' 54' N.	24 9 3 0	♂ Ecliptic opposition ☉ Full moon.
9 19 41 0	♂ in conj. with ♀ long. 1° 14' 8'. Dif. dec. 6° 58' ♀ 21° 3' N. ♀ 14° 5' N.	24 17 56 0	♂ in conj. with α long. 8° 7' 18' Dif. dec. 34' ♂ 25° 28' α long. 26° 2' S.
10 4 9 0	♂ Ecliptic Conjunction ● New Moon.	27 0 0 0	♂ in Apogee.
		27 13 35 0	♂ in conj. with ♀ long. 9° 10' 50' Dif. dec. 1° 11' ♀ 24° 32' S. ♀ 23° 22' S.
		28 0 0 0	♂ at its greatest elonga- tion.

N.B. All the above calculations are made to mean or clock time.

The waxing moon ♀—the waning moon ♂.

METEOROLOGICAL JOURNAL, APRIL, 1823.

1823.	Thermo.		Barometer.		Rain in in- ches.	1823.	Thermo.		Barometer.		Rain in in- ches.
	High.	Low.	+	-			High.	Low.	+	-	
MAR.						APRIL					
26	45°	36°	.	-.05	..	11	54°	30°	+.02	.	..
27	47	35	.	-.03	..	12	45	26	.	-.05	..
28	50	31	+.04	.	..	13	50	30	.	-.02	..
29	47	38	.	-.03	..	14	50	38	+.04	-.01	..
30	60	37	.	-.01	..	15	52	38	+.03	-.02	..
31	59	35	+.02	-.01	..	16	52	36	.	-.12	..
APRIL						17	61	45	.	-.11	.025
1	65	46	.	-.06	..	18	49	40	.	-.15	..
2	54	42	+.02	-.10	..	19	46	33	+.15	.	..
3	53	38	.	-.19	..	20	50	36	+.16	.	..
4	49	38	.	-.28	..	21	56	33	.	-.09	..
5	52	42	.	-.07	.325	22	57	28	.	-.13	..
6	47	38	+.30	.	.175	23	54	40	.	-.12	..
7	45	38	+.14	.	.	24	53	40	+.01	.	..
8	45	35	+.02	-.01	..	25	59	30	.	-.12	..
9	49	35	+.17	-.06	..						
10	50	36	+.12	.	..						

Lower Edmonton.

LITERARY NOTICES.

Mr. H. Phillips, F.H.S. author of the *History of Fruits known in Great Britain*, is engaged in preparing a similar work on *British Shrubs and Trees*, which is calculated to add considerably to general botanical knowledge.

Mr. Worsdale is about to publish by subscription, an original and comprehensive *System of Celestial Philosophy, or Genethliacal Astronomy*; proving the primitive elements of *calculating nativities*, and the true method of *de-veering judgment*.

Dr. Meyrick has just completed a *Treatise on Ancient Armour*, a work calculated to facilitate a right understanding of our early historians and chroniclers, and to throw considerable light on the manners of our ancestors and the science of heraldry.

Mr. Oliver, surgeon, is on the eve of publishing *Observations upon Muscular Contractions*, with his mode of treatment of diseases of the limbs connected therewith, by the application of mechanical apparatus.

Mr. Forsyth is about to publish a translation of M. Magendie's *Précis Elementaire de Physiologie*, tome second, with interesting notes. This volume, with that already published, will form a complete elementary work on this important branch of medical science.

A new botanical work is commenced called the *Naturalist's Repository, or Monthly Miscellany of Exotic Natural History*, consisting of coloured plates with appropriate descriptions of the most rare and beautiful productions of nature recently discovered; by E. Donovan, F.L.S.

A *Young Officer*, author of the popular "*Sketches of India*," has in the press a work called *Recollections of the Peninsula*, containing remarks on the manners and character of the Spanish nation. At the present period this is a peculiarly attractive subject.

Mr. Holderness has in the press a volume entitled *New Russia*, giving an account of the colonization of that country, and the manners and habits of the colonists.

FRANCE.—A *Classical Dictionary of Natural History* has been commenced at Paris. Two volumes have appeared, with coloured plates.

A very important discovery has been made of an Hieroglyphic Alphabet by M. Champollions, jun. by means of which the scholar is enabled to decypher the names of Alexander the Great, Ptolomy, Cleopatra, &c. on the temples of Philæ, Ombos, Dendera, &c. with much other interesting information. He has spent ten years of incessant labour in this pursuit, but he is now amply recompensed.

M. Rossignal is about proceeding to Tripoli, from whence he intends to traverse the desert and penetrate as far as the Niger.

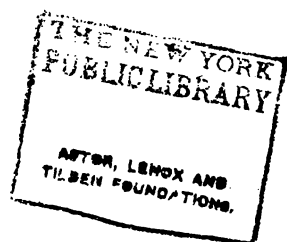
If we may believe the *Bombay Gazette*, a person has lately discovered an alphabet, by which may be decyphered the ancient inscriptions found in the caverns of India, consecrated to the Hindoo worship.

GERMANY.—Dr. Von Schubert has in the press *Travels through Sweden, Norway, Lapland, &c. in the years 1817, 1818, and 1820*, in 3 vols. 8vo.

AMERICA.—Mr. J. D. Hunter, a young man now resident in New York, but whose early years were passed in the wilderness with the Indians, has published an interesting narrative entitled the *Manners and Customs of several Indian Tribes*, with some account of the Soil, Climate, Vegetable Productions, and the Indian *Materia Medica*.

A storm last year tore up a large oak near Brounsville. Under the bark was discovered the impression of a male and female figure standing near a tree, surrounded by deer, goats, bears, fowls, &c. The oak was supposed to be five or six hundred years old; and the impression must have been made long before the time of Columbus.

The mineral collection of the late Professor Haüy, for which in his lifetime he refused an offer of 600,000 francs (24,000l. sterling) will shortly be sold at Paris by public auction.



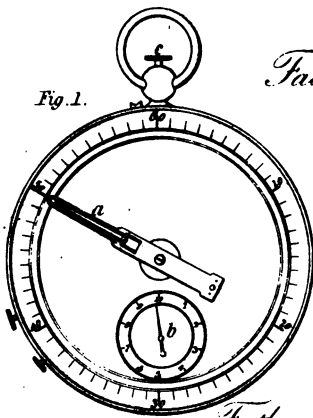


Fig. 1.

Fathoms Watch.

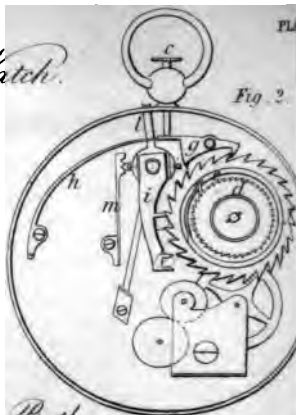


Fig. 2.

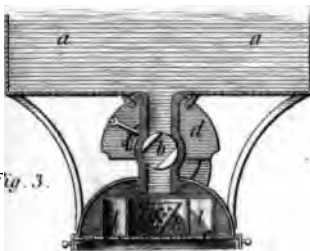


Fig. 3.

Fathoms Shower Bath.

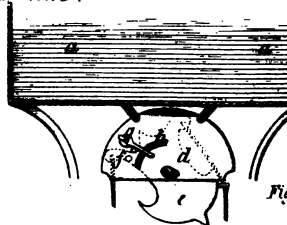


Fig. 4.

Cleveland's Evaporating Apparatus.

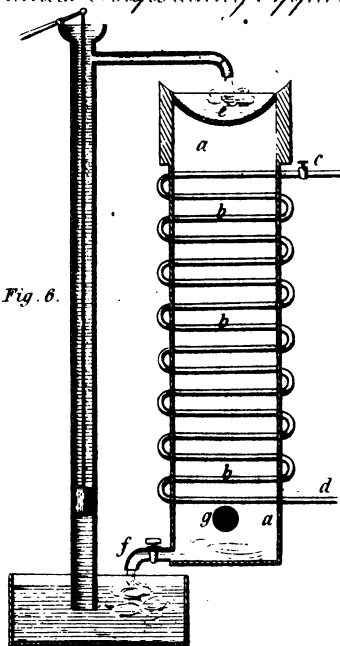


Fig. 6.

Parker's Lamp.

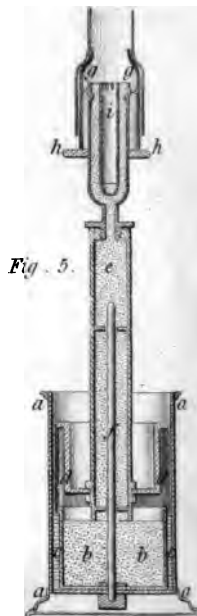


Fig. 5.

THE
London
JOURNAL OF ARTS AND SCIENCES.

No. XXX.

Recent Patents.

To FREDERICK LOUIS FATTON, of New Bond Street, in the County of Middlesex, Watchmaker, for his Invention of certain Improvements on, or Additions to, Watches or Chronometers in general, whereby they may be rendered capable of Marking or Indicating the Precise Moment of any desired Observation, or rapid succession of Observations, and without the Necessity of Stopping the Regular Movements of the Watch, as in the ordinary Stop Watches.

[Sealed, September 27, 1822.]

IN our Fourth Volume, page 296, and Pl. XVI., is described an improved repeating watch, of a very ingenious construction, by the present patentee; the object of which was to mark extremely small divisions of time for the more accurate observation of celestial phenomena: the present invention is for the same purpose, and appears to be only a variation of the same principles to produce the same effect, (though not with that minutiae)

by means not very dissimilar. Pl. XIII. fig. 1, represents the back of the watch, with a dial-plate divided into sixty for the purpose of shewing seconds, the hand, *a*, making an entire revolution every minute. The small circle of ten divisions is furnished with an index, *b*, adapted to make one revolution in ten minutes. The large dial is intended to receive dots from a point upon the long hand, *a*, for the purpose of marking the precise instant of any particular observation, which is effected by the observer holding the watch in his hand, and pressing upon the nob, *c*, in the pendant, at the moment that the phenomenon takes place which he is noting, and this is done without interrupting the regular motion of the index.

Fig. 2, shews the internal construction of the mechanism, supposing the back or second dial-plate, as in fig. 1, to be removed. The axis, or arbour of the main-spring barrel, is furnished with a ratchet-wheel, *d*, and click, *e*, in the usual manner, which is connected with the larger ratchet-wheel, *f*. A small double catch, or detant, *g*, turning upon a centre pin, holds by its hooked end a tooth of the ratchet-wheel, *f*, and is kept in that situation by the tail-spring, *h*. An arm or lever, *i*, acting vertically, rises and falls upon two small pivots at its broadest part. About the middle of this lever there is a small projecting piece with an inclined plane lying under the teeth of the wheel, *f*, (wedge-formed on their under side), from which it may be released by a small arm, *l*, thereto connected, and extending on the outside of the case, where the end of the arm is to be acted upon by the finger-nail; *m*, is a spring, having a piece with two notches to hold the lever, *i*.

The operation of this mechanism is as follows:—The watch being wound up, the ratchet-wheel, *f*, connected

with the arbour of the seconds' hand, has a tendency to turn, but is restrained by the hooked end of the detant, *g*; by pressing, however, upon the nob, *c*, the hook of *g* is raised out of the ratchet-wheel, *f*, and it is permitted to escape one tooth, the heel part of the detant falling into the teeth, and preventing it from going any further. As the under face of this ratchet-wheel, *f*, is cut with wedge-formed teeth or projections, it follows that every time a tooth passes over the small inclined plane, extending from the lever, *i*, that the end of the lever will be depressed, by which operation an elastic arm, carrying a point connected to the hand, *a*, fig. 1, is drawn down, and a mark or dot made upon the surface of the dial-plate. This, as in the former specification, is so contrived, that a small dot of colour shall be deposited, which may be referred to after the observations are ended. It is obvious, that on removing the finger from the nob, the hooked end of the detant will fall into the ratchet, as shewn in the figure; and that as many times as the nob is pressed, so many dots will be made, referring to different periods of observation.

“ If it should be desired to make a small circle of seconds on the same dial, with the hours and minutes, as in the generality of seconds watches, instead of making a separate dial for the seconds, it could be easily effected without making any material alteration in the above-described mechanism; it would only require the marking apparatus to be made smaller, and that the position of the lever should be altered, so that the square notch formed at the end of the lever, *i*, should be adapted to correspond with the centre of the second arbour wherever it might happen to be situated.”

This modification would require some alteration in the position and proportions of the wheel-work, and in con-

sequence, the patentee has given the numbers of the teeth and dimension of the wheels; but as this can interest very few of our readers, we trust its omission will be pardoned; the principles of the invention being as above stated.

Inrolled, November, 1822.

To WILLIAM FEETHAM, of Ludgate Hill, in the City of London, Stove-grate Maker, and Furnishing Iron-monger, for his Invention of certain Improvements on Shower Baths.

[Sealed, June 13, 1822.]

THE intention of these improvements is to enable the patient who is using the bath to regulate the flow of water, and thereby to soften the shower according as inclination or circumstances may require. This object is effected by two contrivances: the first is an adjustable stop, which may be set so as to prevent the cock from turning beyond any certain distance, so as to limit the opening of the water-way to any required discharge: the second is a division of the perforated box, or strainer, into several chambers, by two or more circular concentric partitions, by which limited quantities of water, let out from the cistern above, are necessarily confined to limited portions of the surface of the strainer.

Plate XIII. fig. 3, is a section of the apparatus; *a a*, is the cistern of water, suspended in the usual way, over the closet or box where the patient stands to receive the shower; *b*, is the cock for discharging the water; *c*, is the strainer or grating which distributes it in the form of a shower: fig. 4, shews the contrivance by which the

opening of the water-way is regulated; *d*, is a plate, the cock, as shewn in the former figure, being removed; *e*, is a lever attached to the plug of the cock, *b*, and having two ears or extremities to which the ropes are connected for the purpose of opening and closing the water-way. At *f*, there are two small studs fixed into the plate, *d*, and an adjustable pin, *g*, which hangs loose from a staple; this pin is to be placed against the first or second stud, according to the discharge of water required. A small nob, *h*, extending forward from the lever, *e*, and acting in the curved aperture, strikes against the pin, *g*, and thereby the action of the cock, and consequently the passage of the water, is limited. If, however, the full current from the cistern be required, then the pin, *g*, must be removed, and the cock will be enabled to turn to its utmost extent, and discharge the water through the uninterrupted passage.

The water descending from the pipe falls into the conical strainer, *i*, from whence it flows through the perforations to the grating, *k k*, and is thence distributed in the form of a shower; if the supply from the cock is considerable, then the water will flow over the partition into the next chamber, *l l*, and thereby cover a more extended surface of the grating; or a still larger supply would cause the water to pass over the outer partition, and by that means, increase the shower to the full quantity which such a bath is capable of discharging.

A piece of wood grooved for a gutter is attached to the bottom of the door of the closet, in an inclined position, for the purpose of conducting the water which may splash against the door into the receiving vessel at bottom, and by that means prevent the floor of the room from being wetted when the door of the bath is opened; and a conical plug is introduced at bottom, by which the

water is enabled to run off into any suitable receiving vessel.

The Patentee states, "I do not claim or intend hereby to claim as my invention any of the parts which may be already in use, but I do claim the means of regulating the flow of the water from the cock of a shower bath, and also the method of extending or contracting within central limits, the shower of water at pleasure."

Inrolled, December, 1822.

To THOMAS BURY, of Salford, Manchester, in the County Palatine of Lancaster, Dyer, for his Invention of an Improvement in Dyeing, or producing a permanent Nankeen Colour, on Cotton, Wool, Skein, Yarn, and certain other Articles.

[Sealed, 18th February, 1823.]

THE improvement herein proposed consists in the employment of a different material, to that usually adopted for dyeing nankeen colour, which material, is the bark of a cork tree. "For every twenty pounds weight of skein, yarn, cotton wool, or the same weight of other material, prepare a mordant for dyeing a nankeen in the usual manner; pass the articles intended to be dyed through the mordant from ten to fifteen minutes, then wash them well and raise them in a decoction of the bark of the cork tree, of about fourteen gallons of water to twelve pounds weight of the bark, ground, or well bruised, or crushed; which operation of raising will be effected in from ten to fifteen minutes; then prepare another mordant for dyeing a nankeen colour in the usual manner, pass the articles intended to be dyed through this mordant from ten to fifteen minutes, then

Burgess's Improvement on Wheeled Carriages. 287

wash off in soap and warm water, or hartshorn and warm water, and dry."

These are the directions given in the specification for preparing and effecting a permanent nankeen dye, from the bark of the cork tree; but the Patentee adds, "I do not, however, mean that my invention is confined to this particular mode of preparing and applying the bark of the cork tree, it being obvious, that the mode of preparing and applying it may be varied, but my invention consists in the use, and application of the bark of the cork tree, in whatever form it may be prepared."

Inrolled, April, 1823.

To HENRY BURGESS, of Miles Lane, Cannon Street, in the City of London, Merchant; for certain Improvements on Wheeled Carriages.

[Sealed, 3d September, 1822.]

THESE improvements apply generally to the construction of coach bodies, but particularly to stage coaches, the objects of which are to remove some of the inconveniences which passengers experience in long journies, from the cramped positions of their legs; and the immediate presence of disagreeable persons. The construction of the body of this improved carriage is also designed to afford additional safety to the passengers, by keeping the weight lower and nearer to the centre of gravity, and greater security to parcels is also proposed by rendering the principal part of them inaccessible either to passengers, coachmen, or guards without the knowledge and observation of all parties.

To attain these objects, it is intended to construct coach bodies capable of holding either five, six, seven, or eight inside passengers, having three separate compartments

in such bodies. In the seat at the fore part, the passengers sit with their backs towards the horses, in both the other compartments they sit with their faces towards the horses. The two hinder compartments of the body are made about twelve inches deeper than the fore part, and the roof of those parts is raised, by which means there is room afforded for the introduction of the box intended to hold the parcels, and a platform over it constitutes the floor of the two hinder compartments; the only access to this box, being a flap or door under the feet of the passengers. The space allowed for each passenger is to be divided off, so that the room may be equally apportioned, and the comfort of extending legs and resting the back and head, afforded alike to all.

In order to embrace the double advantages of lightness and strength, the body is proposed to be formed by three layers of thin planking or veneers, upon a temporary frame of ribs made of inch deal, placed about six inches apart. These veneers are of ash or other wood, about one tenth of an inch thick, glued together and fastened with copper nails driven through and clenched. The first layer of veneer is placed upon the moulds longitudinally, and attached temporarily to the mould or frame by brads; the second layer is laid upon the first transversely, and attached with glue and small copper nails clenched on the inside, next a layer of canvas is glued on, and lastly the third layer of veneer transversely, and fastened with copper nails as before.

When the outer layer is completed and the whole dry, the mould must be taken out and the brads drawn, and the points of the copper nails protruding must be clenched, and every inequality on the surface filled off. In order to keep the body in its proper form, two or three pieces of bent ash about an inch thick are introduced and screwed

to the body on the inside. The Patentee concludes his specification by saying, "I have constructed a cabriolet or one horse chaise body upon this principle. The moulds as in the other, were first made and set up to the exact form of the body; and the head and dashing board too, so that the cabriolet body, with head and dashing board, were all formed at the same time, and of the same materials; (viz.) ash veneers, glue, canvas, and copper nails. This mode of building carriages is infinitely more expensive than that in common use, but the great advantages gained in strength, lightness and durability, will amply compensate for the increased expence."

Inrolled, March, 1823.

To Christopher Pope, of Bristol, Speller Maker, and Metal Merchant, for a Composition of certain Metals, to be used for the purpose of Sheathing the Bottoms of Ships and Vessels, and of Roofing the Tops of Houses, or for any other purpose for which such Composition may be applicable.

[Sealed, 8th April, 1823.]

THIS invention is a metallic composition to be formed into plates, applicable to the covering of ships' bottoms, and the roofing of houses, or any places subject to the action of sea water, the air, or of the weather generally. These plates are composed of tin and zinc, or of tin, lead and zinc, combined in the following manner. A given quantity of zinc is to be melted in the usual way in an iron pot, or such like utensil, and when in a fluid state, a similar quantity of tin is to be added, and the whole agitated until perfectly melted. From this mixed metal, cakes are to be cast in a suitable mould, the size

of which cakes are recommended to be about eight inches broad, ten inches long, and three-quarters of an inch thick. These cakes are afterwards to be rolled or hammered out into plates, suitable for the purpose of sheathing of ships or roofing of buildings.

To combine tin, lead and zinc together, a certain quantity of lead is to be first melted in the ordinary way, to which is to be added twice that quantity of tin; this composition is then to be cast into small lumps of any convenient size; and having melted three times the quantity of zinc in a distinct vessel, the lumps of tin and lead are to be introduced into the vessel of fluid zinc, by which the whole will become melted and mixed together. This is found to be the best method of incorporating the metals. Cakes of this composition are now to be cast of the dimensions above stated, and afterward rolled or hammered out into plates suitable for the purposes before expressed. If the cakes are heated to the temperature of boiling water, they will roll or hammer out with much greater ease than if cold.

Care should be taken in melting the different metals, that their temperature be not raised beyond the point necessary to render them fluid, and cause them to compound perfectly; as by over heating the metals they become hard, and in some degree evaporate. It is not essential, that the proportions of the compound metal above named should be strictly followed; they are such as have been found best suited to the purpose, but may be varied to meet the market prices of the different metals.

The specification concludes by saying, "the covering of ships' bottoms, roofs of houses, or other like things exposed to the action of the water, of the air, or of the weather generally, with thin plates or sheathing com-

posed of tin and zinc, or of tin, lead and zinc united, being to the best of my knowledge and belief entirely new and never before used in this kingdom, I do hereby declare this to be my specification of the same, &c. and it is my intention to maintain my exclusive right and privilege to my said invention."

Inrolled, May, 1823.

To WILLIAM CLELAND, of Glasgow, North Britain, Gentleman, for an improved Apparatus for the purpose of evaporating Liquids.

[Sealed, 17th August, 1822.]

THIS apparatus is intended to be employed in evaporating the aqueous parts from syrups, and is formed by a vessel about three feet square, and twelve feet deep; through which a series of pipes are passed and heated by steam: Plate XIII. Fig. 6. shews the contrivance, *a a*, is the vessel above described, and *b b*, are the pipes passing through it, which are heated by a continued flow of steam from a boiler admitted at the cock, *c*, and after passing through the range discharged at the end *d*.

Many series of these pipes pass through the vessel, and are so disposed that they occupy the intervening spaces between each other. At the top of the vessel there is a strainer, *e*, into which the fluid intended to be evaporated is poured or pumped, and descending thence through the strainer in a shower, falls upon the heated surface of the pipes which intercept its progress; by these means the aqueous parts of the fluid are driven off in steam, and the thick coagulated syrup descending to the bottom, flows through the cock, *f*, into the receiver below. An aperture, *g*, in the lower part of the vessel, is intended

to convey heated air from a stove, for the purpose of carrying of the steam evaporated.

Several variations of this apparatus are contemplated by the Patentee, particularly as respects the form of the strainer; and also various fluid requiring to be evaporated may be operated upon by these means, but the principles of the contrivances are simply those above stated.

Inrolled, December, 1822.

To SAMUEL PARKER, Jun. of Argyll Street, in the Parish of St. James's, Westminster, Bronzist, for certain Improvements in the Construction of Lamps.

[Sealed, 10th December, 1822.]

THIS invention applies principally to what may be denominated *static* lamps, that is, those which are acted upon by superincumbent pressure, the object of which is to carry the oil from the reservoir at bottom up to the burner. Plate XIII. fig. 5, shews the manner in which this is effected, as applied to a table lamp upon a pedestal. The lamp is supposed to be cut in section from top to bottom: *a a a*, mark the boundaries of the outer case which may of course be externally ornamented; *b b*, is a vessel for the reservoir of oil placed within the former, between which and the case there is a small space, *c c*, to be filled up with mercury; *d d*, is a cylindrical box, the edges of which descend into the mercury, and by that means form an air vessel within; to this box the upright shaft, *e*, of the lamp is attached, and therefore rises and falls with it, sliding upon the centre rod *f*.

In preparing the lamp, the oil is to be introduced at the top of the shaft, *e*, by which the reservoir, *b*, will become filled, and also the upright shaft; the box *d*, is now to be loaded with a weight just sufficient to cause

the box with the lamp to descend into the mercury, when the elasticity of the air within the box, *d*, pressing upon the surface of the oil in the reservoir, *b*, will cause the oil to rise up the shaft to the burner, and continue so to do as long as any remains in the reservoir, by the box descending as the oil becomes consumed. The elasticity of the air in the box *d*, will enable the lamp to be carried from place to place, without the trouble of removing the balance weight, and the mercury is so situated that it will not be subject to mix with the oil.

Another improvement proposed appertains to the glass chimneys of this description of lamps, and consists in resting the neck of the glass upon three or more bent rods, *g g*, instead of its resting upon the rim, *h h*, as usual. By this contrivance the cold air is more immediately conducted to the burner than by the methods heretofore employed, and the effect will be a more perfect combustion, and a most brilliant and clear light. If at any time the oil should be pressed upon with too great a force, so as to have a tendency to flow over the burner, instead of drowning the wick it would ooze through the small apertures at top of the burner, and by running down the pipe *i*, deposit itself in the hollow part of the box, *d*.

The original features claimed in this specification are 1st, the superincumbent pressure of the air, by which the oil is raised up to the burner ; 2d, the separation of the mercury from the oil, by which very considerable trouble is saved in the proportion of the lamp ; 3d, the mode of resting the glass chimney upon the bent wires ; and 4th, the contrivance of catching the overflow of the oil.

Inrolled, February, 1823.

To DAVID MUSHET, of Coleford, Gloucestershire, Iron Master, for an Improvement or Improvements in the Making or Manufacturing of Iron from certain Slags, or Cinders, produced in the Working or Making of that Metal.

[Sealed, August 20, 1822.]

THE object of this patent is to extract pure metal from the slag or refuse of the iron produced by its ordinary working. The process is, first reducing the slag into small pieces, and then mixing it with certain quantities of *fluor lime*; the proportions must depend upon the quality of the slag, but about five or six parts of the lime will generally answer: this however is left to experiment as a matter which cannot be exactly defined, owing to the variations which arise in the quality of the slag. The admixture is to be moistened with water, in order to bring the parts in more immediate contact.

Portions of the slag are now to be operated upon in the same manner as the primitive ore would be treated in smelting, by which means the metal will run from the silicious matter. The metal, however, thus produced, will be extremely fusible and of a honey-comb substance, it is therefore necessary to continue the operation of the fire for a considerable time, by which it will become hardened. Small particles of impurities will still be found in connection with the metal, and it is proposed to reduce it again to small particles, and operate again as before, by which the iron will become fibrous, and of an excellent quality.

Enrolled, February, 1823.

To ROBERT KNIGHT, of Foster Lane, London, Iron-monger, and RUPERT KIRK, of Osborne Place, White-chapel, Middlesex, Dyer, for their process for more rapid Crystallization, and for the Evaporation of Fluids at comparatively low Temperatures.

[Sealed, 9th May, 1822.]

THE Patentees state, that in the boiling of gelatinous and concrete substances, such as glue or sugar, it frequently happens that the heat communicated from the fire through the metal pan is greater than the conducting properties of the fluid within is able to distribute equally through the mass, the consequence of which is, that a part of the glue or sugar, &c. becomes burnt and weakened in strength, or so much discoloured as to reduce its marketable value. The object of the present invention is to remove this evil by affording a more ready means of evaporating the mass thus subjected to the operation of fire.

In the bottom of the boiler or pan, a pipe is to be introduced and coiled round as a worm, this pipe is perforated with small holes, through which it is intended to force a current of heated air, either by means of bellows, or some such contrivance connected to the end of the pipe on the outside of the boiler. This air may be heated by steam, or may be supplied from an oven, or in any other convenient way, but it must be forced through the pipe, so as to discharge itself at the small holes; and by that means rise up through the fluid matter under operation, when it will conduct the heat more perfectly through the mass, and greatly promote the concretion, by carrying off the aqueous particles with very considerable rapidity.

This contrivance is considered to be applicable to seve-

ral processes where evaporation is required, as in the boiling of sugar, salt, alum, glue, soap, tallow, &c. The apparatus is not claimed as new in itself, but only as applied to the above purposes of evaporation.

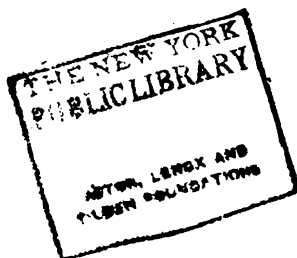
Inrolled, July, 1822.

To WILLIAM JESSOP, of Butterley Hall, in the County of Derby, Ironmaster ; for an elastic Metallic Piston, or packing of Pistons, to be applied either externally or internally to Cylinders.

[Sealed, 27th March, 1823.]

THIS is a very simple contrivance for the packing of pistons, and consists of an expanding coil of metal, which binds round the piston in a spiral form. The Patentee observes, that in the working of that important agent, the steam-engine, a perfectly steam tight piston has long been a desideratum, to effect which object, several modes have been suggested, and for some of them patents have been obtained. But the construction of these expanding pistons has been attended with considerable difficulty, from the circumstance of their consisting of many separate pieces, all of which required the greatest accuracy in fitting; and from their being acted upon by several springs, which cannot be equably adjusted, have consequently been liable to derangement, and hence have not met with that approbation and success, which the importance of the object merits.

These disadvantages are said to be obviated by the employment of the elastic spiral rings herein proposed, which are both simple and durable, and are found by experience to be perfectly effective in their operation. Plate XIV. fig. 1, represents the external appearance of a piston bound round with the elastic metallic spiral : Fig. 2,



shews the spiral removed from the piston ; and Fig. 3, a section of the piston cut through the middle transversely: *a*, is the elastic spiral formed of metal, which is seen at Fig. 2, in the shape it would assume if removed from the piston and unrestrained ; in Fig. 1, it is bound round the piston and made fast, and in the section, Fig. 3, will be seen the hempen packing, *b b*, which is first bound round the piston as a bed for the purpose of preventing the escape of steam. The metallic coil is intended to dilate or contract by its own elasticity, so as to meet the sides of the cylinder with a constant and uniform pressure, sufficient to prevent the escape of steam and yet producing very little friction.

It is stated to be well known to every practical engineer, that the friction of a piston recently packed with hemp has been found greatly to impede its motion in the cylinder, if not to stop altogether the movement of the machinery ; as long as the ordinary packing remains tight, the friction is so considerable as to diminish the power of the engine very materially, and by the wear in working the packing loses its tightness, and consequently the steam escapes without performing its office. By the experience of six months, the Patentee has found, that this metallic packing possesses the advantage of increasing the power of the engine very considerably, and also of effecting a saving of one-fourth of the fuel, and two-thirds of the tallow or other anti-attribitious matter employed.

“ It is unnecessary to enumerate the many advantages of a metallic piston ; it is sufficient to say, that it seldom requires examination, and consequently avoids the serious inconvenience and loss attending the stoppage to steam-engines when employed in steam-vessels, iron works,

mines, and manufactories; and the working tends to keep it in proper order."

These metallic packings are proposed also to be applied to pumps for mines, ships, fire-engines, and a variety of other situations where a perfectly tight packing is required.

Inrolled, May, 1823.

Original Communications.

On the Titles of Patents for Invention.

WE have frequently taken occasion to comment upon the inefficient manner in which some specifications of Patents are framed, with the view of pointing out to Patentees the necessity of describing their inventions in such a clear and unambiguous way, that every mechanic conversant with similar branches of manufactures may sufficiently understand the subject to enable him to effect the object; or make the piece of mechanism, from the SPECIFICATION ALONE; this the laws of patents require as indispensable, and on its faithful performance the safety of the patent right principally rests: but the first and most important consideration in soliciting letters patent, is the framing of the title of the patent in such comprehensive terms as directly point to the invention, (without discovering its detail) and at the same time, embrace such collateral objects as the invention may be applicable to. This may appear to be extremely simple and easy of accomplishment, but is nevertheless a matter which requires more consideration than we find at all times devoted to it.

The two extremes of prolixity or brevity in the title of a patent are equally dangerous; a patent for *improvements in furnaces, calculated to effect an economy in fuel*, would have been a good title, but a patentee thought proper to describe his invention as an "improved method of producing and applying heat," and enumerated a multitude of situations to which it was applicable, "and better than any other method now in use." As to the *production of heat*, we cannot suppose this can be effected by any other means than the combustion of fuel; and of the many purposes enumerated to which this new discovery is stated as applicable, some of them may fail, in some it may not be perfectly original, or possibly in one or two instances may prove not so eligible as other modes employed for a similar purpose. Thus, upon a strict enquiry into the validity of such a patent by writ of *scire facias*, the patent would probably be vitiated upon the ground of not effecting that which its title professed. A patent was obtained for "*a new anchor*," not a *new form of anchor*, or *an improved construction of anchors*; consequently, as the title does not contemplate a variation in form from those anchors which have been heretofore made, any peculiar construction or novel conformation of anchor could not be maintained under this title.

A patent was obtained for an "improvement in the formation of bolts and nails for ships and other fastenings," but in preparing the specification it was discovered that the patentee had no peculiar or novel mode by which these bolts were to be made, his invention was merely an improvement in the *form* of the bolt. This was considered a fatal error, and the process of soliciting the patent was gone through again *de novo* under the latter title, fees of office being allowed. Again, a patent was proceeding under the title "improvements in the

making of iron for the manufactory of," &c. &c. It was, however, thought desirable that the affidavit of the patentee should only extend to the *preparation* of iron for the manufactory of, &c. &c. A patent was granted for a certain composition, to be used for the purpose of improving a certain description of manufactured articles, but it did not appear that the composition itself was the invention of the patentee, it was merely its employment to produce a certain novel effect which he intended to claim; unfortunately, however, the title claimed the composition, and neither embraced the new material it produces, or the mechanism by which the object is effected.

These remarks are intended to draw the attention of patentees to that very important feature in every patent—the phraseology of its title. Circumstances are so extremely variable, that no definite rule can be laid down, except that it is always desirable to use the most unequivocal, and at the same time the most comprehensive, terms that the invention will admit of, so as to make the object evident, and also to embrace every collateral application of the leading features of the invention.

Cook on Electrical Conductors.

IN our last (p. 255,) we promised, in compliance with Mr. Cook's request, to notice the subject of Electrical Conductors, and to extract some portion of his former communications made on that subject to the late Mr. W. Nicholson, and published in his *Journal of Philosophy*. The first of these papers will be found in Vol. XXIX. of Nicholson's *Journal*, and which treats principally of the advantages of electrical conductors placed in ele-

vated situations, at five or six miles apart, all over the kingdom; the composition of which is to be copper or brass—iron being the worst conducting metal, and very subject to oxidize, and gold the best. The effects of electricity, however, are frequently so extremely local, that the proposed plan does not appear to us as likely to produce much advantage: conductors are now very prevalent in large towns, and it is pretty well understood that copper rods are the best for that purpose.

That part of Mr. Cook's communication which refers to lightning conductors on ship-board, we think it proper to quote, as he, at all events, therein establishes his claim to the invention of conducting rods leading from the mast-head down to the sea:—

“ ‘The present conductors on shipboard, where any are used, are I believe constructed of chains, which are the worst of all conductors, as the lightning has to run down the most irregular of surfaces, besides their being so clumsy. But my brass rods might be so attached to the mainmast, and the collecting point raised above the top; and where the joints of the mast are, there might be a round universal joint, that would bend in every direction with the mast. The rod might be carried down thus into the sea, and the expense of them would be so trifling, that one would hardly think any vessel would be without one, especially when it is considered, they would be made of a metal allowed by all who have written on electricity, to be the best conductor of lightning.’ ”

“ Annotation by Mr. W. Nicholson.

“ The subject of conductors for lightning being still obscure, I have with pleasure inserted Mr. Cook's communication without considering, as at all needful, that an acquiescence in its contents should be implied through-

out on my part. Being founded on the generally admitted doctrine, it is in many respects entitled to consideration, and like all other ingenious researches, is calculated to excite investigation. On the present occasion I would remark, that the course, disposition, and striking places of thunder-clouds appear to be governed in a very great measure by certain conducting parts lying along or within the earth either as ridges or internal masses, and that the stroke from a stratum of clouds, many miles in length, seems to be determined by an action which extends far beyond the influence of any metallic rod,—even supposing this last to be inserted into the conducting mass itself: that the whole process of atmospheric evaporation and condensation appear to be accompanied with electric phenomena upon a very extended scale, but most strikingly manifest when the changes are rapid; this last being the only difference between thunder-storms and common squalls or showers: and that it does not seem probable that our rods can essentially modify the course of these effects. Other more remote considerations would offer, if they could; such as the possibility of an interruption of the ordinary course and frequency of showers, which Darwin thought within the reach of human power, and the greater probability that the atmospheric electricity of a whole country would soon destroy any series of conductors; but the affair of the poor-house at Heckingham, in Norfolk, which, about thirty years ago, was struck and set on fire by lightning, without touching any one of eight elevated metallic conductors attached to the building, has been considered as a proof of the very limited influence of these rods, and that their power of protecting a single edifice requires the condition, that all the conductors should be connected together, and with the metallic parts of the house.”

The subject is continued in Vol. XXXI. in the following words:—

“ Electric rods should be three-quarters of an inch in diameter, according to my opinion; should not touch the building in any part by three inches; and all their fastenings to it should be by non-conductors. They should end in a single point of brass, and this point be elevated six feet at least, but ten feet if possible, above the highest chimney of the house. If the rod is not of brass, or a tube of brass, a strong brass wire ought to be wound round it, connected with the point, and passing once round the rod in the space of 12 or 18 inches, sufficient to keep the brass wire close to the iron, all down to the earth. I have no doubt upon my mind, from all the observations I have made, that electric rods of this nature will never fail to give perfect safety. Even on board vessels, an iron chain, the worst of all conductors that can be called a conductor, has been known to preserve the vessel and crew. As a proof, I will quote a passage from Captain Cook’s Journal of his Second Voyage Round the World. ‘ April 25, 1774. Otaheite.—This day we had a very violent tempest. We were obliged to get our electrical chain up to the top-gallant mast-head, to secure the masts. Removed all the iron off the decks, and secured down all the hatches.—As the seaman, who carried the chain up, was coming down, he got foul of the chain, and it lightning at the same time, he received a slight blow on the leg, which, though it did him no harm, shook every bone within him.’ Captain Cook had seen an instance of the great utility of the electrical chain in his former voyage, while at Batavia, which, being of a singular nature, I shall relate in his own words, or as they are given by Dr. Hawkesworth. ‘ About 9 o’clock we had a dreadful storm of

‘thunder, lightning, and rain, October 10, 1770, during which the mainmast of one of the Dutch East India-men was split, and carried away by the deck. The main topmast and top-gallant mast were shivered all to pieces; she had an iron spindle at the main top-gallant mast-head, which probably directed the stroke.—This ship lay not more than the distance of two cables length from ours, and in all probability we should have shared the same fate, but for the electrical chain, which we had but just got up, and which conducted the lightning over the side of the ship. But though we escaped the lightning, the explosion shook us like an earthquake, the chain at the same time appearing like a line of fire: a centinel was in the action of charging his piece, and the shock forced the musquet out of his hand, and broke the ramrod.—Upon this occasion, I cannot but earnestly recommend chains of the same kind to every ship, whatever be her destination; and I hope that the fate of the Dutchman will be a warning to all who shall read this narrative, against having a spindle at the mast-head.’

“Thus, even chains have been found protectors, and if proper conductors were attached to the main-top-gallant mast, running all down it with a joint at the place where the mast is jointed, it would always be in its place; and I again say, I am pretty confident that vessels would be secured from the injury they but too often sustain from lightning, as well as houses.—The rod would not be in the way of any of the rigging, and therefore I should think it would be a duty the masters of vessels owe to their sailors, as well as to the owners of the property they have on board, to be always provided against danger.

“Yours, &c.

“Birmingham, 27th June, 1811.

“B. COOK.”

For the London Journal of Arts and Sciences.

A REMEDY for the inconveniences attending the lime refuse, after the purification of coal-gas, has occurred to the writer hereof; and it is so obvious that it seems strange it has never been put in practice. Let a pan be made to slide into one of the retorts, and the lime refuse being put therein, the offensive matter may be distilled off through a pipe (connected with the bend of the H pipe) into the chimney, and the lime will remain in a fit state to be used again for the purpose of purifying. There will then need little addition to the first supply of lime for gas-works; and the trifling increase of expense for fuel will not be of much moment.

PRO BONO PUBLICO.

Wigan, May, 10th, 1823.

Nobel Inventions.

Perkins's New Steam-Engine.

We have great pleasure in stating that the experiments which Mr. Perkins has made since our last notice, relative to his new mode of generating steam, are, in every respect satisfactory: we have been several times present while the engine was in full action, and upon the score of perfect safety, have not the smallest doubt. There remains, however, to be determined the absolute quantum of power gained by this plan of construction; that a very great power is obtained is self-evident. Knowing the anxious enquiries which the notices of his invention

has created in every part of the kingdom, we had commenced a plate, exhibiting the construction of the engine, being desirous of enabling our readers to form their own opinions from the plan, as it is in operation. But upon the suggestion of the patentee, we feel ourselves compelled to withhold, for the present, this exposition, as it would be premature to publish the details before the specification is inrolled. This document will, however, be deposited in the Inrolment Office, on the 10th of June: we can therefore with confidence promise that our next shall contain a very particular description of the invention.

Breaking Flax by Machinery.

MR. BUNDY, who has obtained several patents for dressing flax, has just completed a new construction of machinery, to be worked by steam, for the purpose of breaking raw flax, and clearing it from the boon. Several of these machines are in operation at the steam-mills of Messrs. Dews and Co., Tadcaster.

The stems of flax in their raw state, spread out in bunches, are held by clamps, and in that manner introduced in a pendant position between the teeth of a series of vibrating beaters; the clamps are connected by cords and pullies to the machinery, and by that means are gradually drawn up, by which means the boon is scraped off, and the flax delivered in a clean, fibrous state, ready for the dresser. This process is said to produce an article very much superior in quality to any other machinery heretofore employed, and also to effect a considerable saving compared to other methods, by not injuring the fibre of the flax, which, when cleared of its boon, or woody parts, by this machinery, invariably

leaves from twenty-five to thirty per cent. of its original weight in clean long fibre.

This machinery is the subject of a recent patent, the specification of which is not yet inrolled ; when that is done, we shall take an early opportunity of describing its construction, and mode of operating, with such representations as the subject may require.

Ventilating Hay Stacks.

THE very serious injury frequently experienced by stacking hay before it is sufficiently dry, has induced Mr. Arthur Biddle, of Playford, near Ipswich, to contrive a simple mode of ventilating hay stacks, whenever it should be found necessary from the hay acquiring a dangerous degree of heat. The mode adopted is by boring holes either in a vertical or horizontal direction through the hay stack, by which the heat is allowed to escape, and the hay preserved from injury. The peculiar kind of borer employed for this purpose is shewn in Plate XIV. Figs. 4 and 5. " This borer, represented one sixth of the real size, may be compared to a solid corkscrew, only that the blade is wrapped round the rod, and does not form a part of it. The rod from *a*, to its point *b*, is made round and tapering. The blade at its lower extremity is formed into an eye, which is secured to the rod by means of the screw, *c*; from this point the fin or cutting edge gradually increases in width, and is wrapped round the rod, at equal intervals, to the point *a*, where is formed a square hole, for the rod to pass through, as shown fig. 6, and in which it is secured by the screw *a*, fig. 5 ; the rod being in this part made square to fit the hole. From *a* to *d* the cutting edge is broad, and nearly at right angles with the rod ; the part *d e*, is

turned up, nearly at right angles to the preceding, and it curved, as if it were cut out of a cylinder, so that every part is equally distant from the axis. This part of the cutter must necessarily be longer than the distance between the spirals, otherwise the cuts would not be united; the edge also is made to slope backwards, as shown *d e*, fig. 8, in consequence of which form, it gives a drawing cut, and thus divides the hay with great facility.

The rod is cylindrical, about twelve feet long, and three-fourths of an inch thick; it is turned by a cross-handle, *ff*, fig. 9, and may be secured at different distances, according as the instrument advances into the stack, by means of the screw *g*, taking into the holes *h h*, which are sunk to the depth of about a quarter of an inch. In the end of the rod is a square hole or socket, for the purpose of fastening on another length of rod, the projecting end of which fits into the socket, and is there secured by a screw.

The other part of the apparatus is the drawing screw, *i k*, fig. 4., the diameter of which is nearly equal to that of the hole made by the cutter, and by means of it the plug of hay, detached by the knife, is drawn out.

Figs. 6 and 7, represent the cutter as seen parallel to the axis of the rod, and looking from or towards its point.

Directions for using the Instrument.

“First cut away the loose hay, where the borer is intended to be applied, then insert the point of the borer, and by means of the cross handle turn it round, till the stack is pierced either quite through, or to a sufficient depth; then withdraw the cutter, and by means of the drawing screw repeatedly applied, take out the plug of

hay which has been detached. If, however, the hay be in a moist, heating state, it will occasionally coil round the cutter in proportion as it is pierced, and impede its action. In such cases, the drawing screw must be slipped over the rod of the cutter, as shown fig. 1., and must be applied from time to time, to draw out the hay, in proportion as it is detached from the mass."

For this invention the Society of Arts have presented Mr. Biddle with their silver medal, and one of the instruments is placed in the Society's Repository, Adelphi, London.

Glazing for common Red Earthenware.

J. MEIGH, Esq., of Shelton, Staffordshire, has communicated to the Society of Arts, a mode of glazing vessels made of common red earthenware, by a material which is free from the poisonous properties which belong to the ordinary ingredients used for that purpose. The very satisfactory proofs of the advantage to be obtained by this discovery, has induced the Society to present that gentleman with a gold medal.

The common red earthenware is made of brick clay, and hence is extremely porous, it is also baked at as low a temperature as possible, not only to save the expense of fuel, but because common clay varies considerably in fusibility, and will not always bear a high firing without losing its shape, and becoming unsaleable.

For the reasons above-mentioned it is necessary to employ a glaze, fusible, cheap, and capable of filling up the pores of the ware, so as to enable it to hold fluids, in ordinary use, either as articles of food, or of domestic employment. Litharge, and the common potter's lead

ore, are the articles usually employed, the one for the transparent, the other for the black opaque glaze. The objections, however, to a glaze wholly or in part composed of lead, are, first, that it cracks when raised rapidly to the temperature of boiling water, on account of the different ratio of expansibility, between the glaze and the clay, and then admits the liquor into the body of the ware; secondly, the glass of lead by itself, or even when mixed in small proportions with earthy substances, is very soluble in vinegar, in the acid juices of the common fruits, and in animal fat when boiling. When such substances, therefore, are cooked in vessels of common red earthenware, a quantity of salt of lead is formed, which, mixing with the food, produces violent cholics, and all the serious, and often fatal effects, that attend the internal administration of the salts of lead.

The discovery of a better and more wholesome glaze, sufficiently cheap to be applied to the common red ware, appeared to the Society to be an important desideratum, and in their opinion this is now effectually supplied by the discovery about to be detailed.

The rock called red marl, is usually in the form of beds of a soft, coarse slaty structure, and red colour, forming the chief part of the common soil, in many extensive districts in this island, to the N. and W. of a line running obliquely from Durham to Exeter. This marl is easily ground in water to an impalpable powder, which remains suspended for a considerable time in the fluid. A mixture of this kind is prepared, and the ware, previously well dried, but not burnt, is immersed in it. The superficial pores of the clay are thus filled with fine particles of the marl, and a fit surface is prepared on which to lay the glazing. Being again carefully dried, the ware is ready for the glaze, which is thus composed :

New Method of Welding thin Plate Iron. 341

Take 1 part Cornish granite, consisting chiefly of felspar,

1 part glass,

1 part black manganese,

the whole well ground together, and diffused in water, to the consistence of cream. Dip the ware in this mixture, and, when thoroughly dry, place it in the kiln and fire it in the usual way. The result will be, a solid black glaze, very permanent, and not containing any ingredients noxious to health. If an opaque white glaze is required, omit the manganese.

Mr. Meigh has also employed common marl and the red marl as ingredients of the body of the ware, with excellent effect, without increasing its expence: he uses for this purpose, 4 parts of common marl, 1 part of red marl, and 1 part of brick clay. Vessels made of the above mixture, are in possession of the Society. The colour of the body is a reddish cream brown, it is harder, more compact, and less porous than the common red ware; and its general adoption, with the above-mentioned glaze, would contribute in no inconsiderable degree to the health of the lower classes, by whom the common red ware is alone used for vessels of cooking.

New method of uniting the Edges of thin Plate Iron, by Welding.

THE operation of welding together the edges of thin plate iron, is, we believe, a novel practice in this country, and one which we should scarcely have credited without ocular proof. This process is said to have been first practised by a Mr. Pettybone, of Boston in North America, who may be called the inventor; it is, however, now in very successful operation, at the works of Messrs.

Hancock, Willsoughby, and Co., Birmingham, and in some manufactories at Sheffield and its neighbourhood.

Our attention has been directed to an article upon this subject, which recently made its appearance in a contemporary periodical, the writer of which assumes to be extremely learned in all branches of *technical* knowledge; it has, however, several times occurred to our minds, that he would have written none the worse, if he had understood his subject; but our readers will, perhaps, be gratified by an extract.

"We have lately seen several cylindrical tubes made of *thin sheet iron* from Birmingham, said to be *welded together* at the junctions of their edges, by some Americans there. Now we can hardly believe it practicable to *weld* thin sheet iron tubes, without utterly destroying their form, which is not the case with the tubes above alluded to; and therefore, we conceive that they must have been *soldered* together."—"We apprehend that the parts to be soldered together should be made bright and perfectly free from any scales and rust, and then to be moistened with a solution of sal ammoniac, and laid together in their places: they should then be bound together securely with iron binding wire and perhaps clamped also; a mixture of the powdered borax and cast iron filings should then be made with water of a thick consistence, and be laid along the joint in the inside of the tube; which should be heated over a clear fire, until the cast iron fuses. Before laying the parts together, after brightening them, it would be well to make a shoulder or depression along one edge of the sheet iron at the required breadth of the lapping-over or joining; which would serve to prevent the parts from slipping over each other in soldering; and which afterwards might be removed by planishing."

“The sheet iron tubes had evidently been heated to a considerably high degree, as they were coated all over with a thick black scale; the joints were however perfectly sound, and no marks of the hammer were visible, as would have been the case in welding them had it been practicable. The sheet iron which the tubes were made of, was not more than the thirty-second part of an inch in thickness: they were about five inches long, and four inches in diameter; and the lapping over of the iron at the joints was about three-eighths of an inch broad.”

The cylindrical tubes above alluded to were made for Parker's Improved Lamps, described in our present Number, page 292. It is rather an extraordinary piece of conceit in a public writer, first to deny a fact of which he has both oral and ocular testimony, and then to exercise his own imagination in describing a process of which he is totally ignorant. As, however, the invention may be useful in many situations, we beg leave to submit the details of this novel operation of welding the edges of thin plate iron as it was performed under our own observation by an ordinary working smith in the neighbourhood of Birmingham.

A piece of thin plate iron in its black state was carelessly bent up by the hammer into the form of a cylinder, the edges meeting, though not with any particular accuracy; a small portion of a hard shining material, which looked something like pitch, was then pulverised in a mortar, and a little of its powder laid upon the joint which was about to be welded. The cylinder was then held by a pair of tongs in the forge fire and made red hot, by which the powder became melted, the iron was immediately withdrawn from the fire, and being brought over a cylindrical arm extending from the anvil,

so much of the joint was beaten with a hammer, and welded together as the continuance of the heat would allow. Other small quantities of the powder were from time to time laid upon the unjoined edges of the plate iron, which on being again introduced into the forge fire, and raised to a red heat, was expertly withdrawn from the fire, and beaten by a hammer until the edges of the plate iron were perfectly welded together and the cylinder complete.

This operation appears to be very easily effected by a dexterous workman, and though the edges of iron plates as thin as the seventieth part of an inch, have been (as we understand) frequently welded together; yet it does not appear that more than one in fifty upon an average, have been burnt and spoiled in the operation. We have for our own satisfaction preserved the identical cylinder welded under our own observation, in which the union of the edges appears to be extremely perfect, and the metal though in so thin a body is in no way injured by the fire; the only part of the process which is involved in secrecy, is the material which is employed as a flux, this is known only to a few: it is not, however, a metal by which the parts might be soldered together, but has merely the effect of removing the black scales and oxidation on the surface of the iron plates, and also of excluding the air while the edges of the metal are (at a temperature very much below its melting point,) by the hammer brought into perfect cohesion.

Improved Bridle Bits.

MR. C. GOODWIN, of London Wall, has invented an improved bridle bit. He states that "in the ordinary bridle bit, billets or loops are fixed upon the cheek, through one

of which the end of the rein is passed and made fast by a buckle. Each billet being at a different distance from the centre of motion, the leverage of the rein may be adjusted to any required degree, by fixing it nearer to, or farther from the centre. Occasions frequently occur in a journey for changing the leverage, which is not very easily effected when the fingers of the driver are benumbed with cold, nor very safely with a restive horse, since in the process of changing the bearing, the rein must for a time be completely disengaged from the bit, and the horse may then start off in a perfectly unmanageable state."

"The improved bit is intended to obviate this inconvenience, in which there is only one billet moveable on the cheek or lever, and therefore admitting of the bearing being changed in a moment without the trouble and hazard of unbuckling the rein. Plate XIV. Fig. 10, is a perspective view of the bit, *a c, a c*, the levers which are cylindrical having (instead of billets or loops) three cylindrical portions, which are divided from each other by the ridges *d and e*; *b b*, the two billets with collars to slide up and down the levers; this, however, cannot take place on account of the ridges unless when the billet is brought half round as shewn by dotted lines in Fig. 11, for on that side the collars have a groove to pass over the ridges, as shewn in Fig. 12, when *b* is the billet and its collar, and *c* a section of the lever and ridge; so that instead of having to unbuckle as in the old mode, the billet collar is turned half way round, as in Fig. 11, where by dotted lines the collar is shewn sliding over the ridge to the required part of the lever, and then turned back again as *b*; but lest by any accident the billet by being shaken half round should slide down of itself, the collar on the outside of each billet is left a

little longer at the bottom near the loop, (as *b b*, Figs. 11 and 12,) by which it cannot turn round to pass between the ridges on the outside, and the motion on the inside is sufficiently guarded by the horse's neck preventing the reins from falling that way."

For this invention the Society of Arts have presented Mr. Goodwin with their large Silver Medal.

Polytechnic and Scientific Intelligence.

Royal Academy.

IN compliance with our annual custom at this season, we have paid our inquisitorial visit to this Exhibition of the Fine Arts, which we regret to say is one of the most feeble displays of congregated talent that we remember to have seen within the walls of the Academy. If we were to suppose that the eleven hundred and thirty-one subjects exhibited are the best specimens that could be selected out of about three thousand sent to the Academy, our conclusion would be, that the British School of Art must be upon the decline; but happening to have seen some of the rejected pieces, we are compelled to draw a different conclusion, and only regret that a receptacle has not yet been opened, for the admission of such outcasts, as the hanging committee could not conveniently fit in between the pictures of the Royal Academicians and their favoured friends.

Such, however, as the exhibition is we proceed to its consideration, premising that by far the greater part of the pictures are considerably below mediocrity, but few worthy of admiration, and scarcely any equal to the best

specimens on former years. Our remarks will, therefore, be limited to those subjects which appear most striking; and, beginning in the great room, we observed, No. 6, *Effects of an Earthquake*, by J. TARRANT. We have no desire to see the effects of so dreadful a visitation, but should hardly expect that a building like St. Paul's Cathedral would, under such circumstances, retain its perfect form, and throw a summer set. Our inexperienced notions are that it would fall to pieces. No. 9, *Don Quixote in his Study*, by G. S. NEWTON, is a small picture displaying considerable talent. No. 31, *The Solar System*, by H. HOWARD, R. A.

"Hither as to their fountain, other stars
Repairing, in their golden urns drew light."

————— "wandering fires that move
In mystic dance, not without song."

This is a very happy personification of the poet's allegory, in which the characteristic forms representing the planets and their satellites are disposed with exquisite taste and strict propriety; the colouring, though brilliant, possesses an ærial softness which is in perfect harmony with the whole design; and this picture, perhaps, may be pronounced one of the best productions in the present exhibition. From this pleasing effort of the imagination, we turn to one of a very different character, No. 22, *The Dawn*, by H. RUSSELL, R. A., and are very much indebted to the catalogue for its information, as we should certainly never have discovered the intention of the painter without it. No. 34, *John Knox admonishing Mary Queen of Scots on the day when her intention to marry Darnley had been made public*, by W. ALLAN. This picture displays considerable talent; it is, however, far from meriting any high commendation. No. 59, *Salisbury Cathedral, from the Bishop's Grounds*, by

J. CONSTABLE, A. The distance in this picture is tolerably good, but the trees in the fore-ground have every appearance of having been produced by an indiscriminate sprinkling of white and green paint thrown from a distance on to the canvas. No. 67, *A Fish Auction*, by W. COLLINS, is a very well executed picture, and does great credit to the artist. No. 77, *The Bay of Baia, with Apollo and the Sybil*, by J. M. W. TURNER, R. A. This is the strongest confusion of colours without any effect, that ever was daubed on to canvas. No. 128, *The Reconciliation*, by J. P. STEPHANOFF, is an extremely clever picture, surpassed only by some of the best productions of Wilkie. The subject is a recently married couple, with whom the father of the bride has just consented to a reconciliation; the perfect satisfaction of the three principal characters is well expressed, and the joy of every other member of the family is exhibited in an admirable and masterly manner. No. 130, *Instruction thrown away*, by J. CLOVER:

“ Oh grandam ! close that moral page,
 Since closed to thee is Lucy's ear :
 Accents more sweet that ear engage,
 For lo ! a whispering lover's near.”

This is a pleasing little picture, well conceived, and tolerably executed.

No. 131, *Portrait of His R. H. the Duke of York*, by D. WILKIE, R. A., is a well painted portrait; but surely the pencil of Wilkie ought to be above portrait painting. No. 135, *The Parish Beadle*, by the same artist, is certainly a masterly production, but not equal in attraction to his former pictures. The subject is two gipsies and boy, with music, dancing-bear, dog, and monkey, driven to the cage. The angry remonstrance of the gipsies, the unrelenting perseverance of the beadle,

nd the passive submission of the boy, and the rest of he train are admirably expressed. No. 136, *Christ crowned with Thorns*, by R. WESTALL, contains some powerful touches of a masterly pencil, but the principal figure appears gigantic and stiff. No. 158, *Dutch Market-boats, Rotterdam*; by A. W. Calcott, R. A. is a well painted and busy picture, the relief between the houses on the quay in the distance, and the vessels, with living figures, in the forepart, is managed with taste and fine effect. No. 196, *Comus, with the Lady in the Enchanted Chair*, by W. HILTON, R. A. This picture, both in design and execution, is not inferior to any in the Exhibition. No. 197, *The Child exposed by Antigonus on the Sea-shore, found by the Shepherd. From Shakspeare's Winter's Tale*, by H. THOMSON, R. A., is a very pleasing picture. No. 199, *Carrying home the Orphan Lamb*, by J. KING, is a picture which does great credit to the artist. No. 212, and No. 375, *Portraits of Gentlemen*, surprised us: how such daubs of brick-dust and white-
ing could gain admittance we were at a loss to imagine, until, referring to the catalogue, we found the name of J. NORTHCOTE, R. A. No. 214, *The Parish Clerk: Saturday Evening; rehearsing the Psalms*, by E. BRISTOW, is a very clever picture. No. 233, *The Battle of the Angels; a Study in chiaro scuro*, unfinished, by W. YOUNG OTTLEY, H., is a very extravagant subject, but contains some good drawing. No. 253, *Fish-boats at Newcastle Quay*, by T. M. RICHARDSON, is extremely well managed both in drawing and effect, and forms a very pleasing picture. No. 278, *The Lost Child: the View in Newcastle-upon-Tyne*, by J. RAMSAY, has merit; the figures, we presume, are portraits. No. 293, *The Deer Stealer*, by J. WARD, R. A., is an attractive

picture, though perhaps not the best effort of that artist. No. 315, *Fishing-boats off the Harbour of Campleton, Argyllshire: Evening*, by P. H. ROGERS, is a very creditable production. No. 332, *Defeat of the Turks under the command of Ali Pacha (in his attack on the Republic of Suli) by the Souliotes, in the Defile of Klissura*, by D. DIGHTON. This is a very showy production; the design is grand, the colouring and effect good. No. 333, *Tourists in the South of Ireland: Ascent of the Gaultee Mountains*, by W. H. BROOK, has merit. No. 335, *The Holiday Refused*, by R. FARRIER, displays talent, but is deficient in finishing. No. 336, *The Traveller disturbed at his Repast*, by W. KIDD. This artist is treading very hard upon the heels of Wilkie: the coach-passenger, which forms the subject of this picture, is roused from his meal by the time he has swallowed his second mouthful, but not before the bill has been presented; there are but three figures introduced, but the subject is natural, and full of humour. No. 343, *Portrait of J. Gage, Esq.*, by MRS. W. CARPENTER, reminded us of Vandyke. No. 369, *Song of Death*, (*Vide Burns' Poems*), by H. CORBOULD, is a very fine picture. No. 384, *The Lily and the Rose*, by R. WESTALL, R. A. We are sorry to see this from an artist who has long and deservedly been admired. No. 417, *Landscape, with Warriors of old times in England retired to the shade of a Mountain Glen to hear the Song of their Minstrel*, by F. DANBY. This is a grand picture, but rather too dark. No. 519, *Study in Chalk; Portrait of a Gentleman in the dress of a Dutch Farmer*, by D. WILKIE, R. A. We cannot admire the taste of a gentleman assuming a drunken character, but such a production as this, presented to the public, from the pencil of Wilkie, is little less than an insult. No.

977, *Christ Instituting the Sacrament*, by W. BROCKEDON, is a fine head; but, after West's pictures, all these subjects fall into the shade.

We pass over the multitude of portraits not only as generally uninteresting, but as a confined branch of the art which requires comparatively little talent; for there can be no question but that the delineation of groups of figure in busy life, with the varieties of landscape and other scenery, calls forth an extent of genius and ability, which is not exercised in the representation of the human countenance alone.

The architectural designs are not particularly attractive. No. 964, *Part of the County Hall, Lancaster Castle*, by J. GANDY, A. is among the best. The design is tasty and appears to be in unison with the principles of gothic architecture, which has not always been the case with modern attempts of this kind; No. 971, *Elevation in perspective of a design for rebuilding London Bridge*, by W. Tite. The appearance is grand, but with Waterloo Bridge in view, we can scarcely look upon any design without considering it common-place.

The sculpture in the Model Academy taken as a whole, is by no means equal to the exhibition of former years. Of the busts those by R. W. SIEVIER, are not inferior to the best specimens in the room: we mention this, because only three years back this young artist, who was an engraver, first took the chisel in hand. There are two very excellent plaster busts, by J. DEVILLE, which we presume are casts from the life, at which this gentleman is extremely happy. No. 1065, *The Prodigal Son*, by V. GAHAGAN, is a very well executed model, but the hand has certainly ladies' fingers. No. 1081, *An unfinished statue in marble, of the son of J. G. Lambton, Esq. M. P.*, by W. BEHNES, is good; 1082, *Horace's Dream: an alto relievo in marble*,

by R. WESTMACOT, R. A. is a work which exhibits considerable taste and talent: as also does the two figures, 1098, *Zephyrus and Aurora*, by C. ROSSI, R. A.. No. 1100, *Statue in Marble, a Cricketer*, by H. ROSSI, is clever, but it would be extremely difficult to determine whether the legs, arms, and body of the figure are intended to be naked or clothed. No. 1101, *Danzatrice*, a marble figure, by CANOVA, is beautiful in the extreme, we have seen nothing in any degree worthy of comparison with this, except the two children by Chantry, in Lichfield Cathedral; indeed if we may be allowed to express our own opinion, this figure is scarcely surpassed by the finest specimens of the ancients.

Royal Society.

March 20.—The reading of a paper commenced on March 13, on the motions of the eye, in illustration of the uses of the muscles of the orbit, by Charles Bell, Esq., communicated by Sir Humphey Davy, Bart., P. R. S. was resumed and concluded. The ingenious and scientific author proves that every time the eyelids descend to cover the transparent part, or what we call the front of the eye, the eye itself ascends by a counter-revolving motion; and that if this were not the case, the surface of the eye would not be moistened, nor freed from offensive particles. He proves also that when we sleep, the eye is turned up, and the cornea lodges secure moistened by the tears, under cover of the upper eyelid; and that these motions are insensible, and provided for the safeguard of the eye. The eye being thus always elevated in sleep, insensibility, and on the approach of death, a distorted position is occasioned, which in the latter we compassionate as the expression of agony.

The author promises to explain in a second part of his paper, the distinction in the uses of the orbit.

April 10.—The Society met after its adjournment in consequence of the fast and festival; when a paper was read entitled an account of an apparatus on a peculiar construction, for the exhibition of electro-magnetic experiments; by W. H. Pepys, F. R. S. The apparatus was constructed under the direction of the author, at the London Institution, and consists of two plates, one of copper, and the other of zinc, each two feet wide, and fifty feet long, giving together a surface of two hundred square feet; coiled round a centre, and prevented from coming into contact with each other by the interposition of three cords of hair line, and slips of wood at regular intervals. Two conductors of copper wire are attached one to the copper, and the other to the zinc plate; and in order that so large a body may be readily employed, the apparatus is suspended by a pulley and counter poise, and so let down into a tub of acid. It exhibited very powerful effects; for upon being brought into contact, a change was produced, at the distance of five feet, in the direction of compass needles. Steel bars enclosed in glass cylinders, with wire wound spirally round them, were rendered magnetic, and several of them suspended together. The electric intensity of the apparatus is very slight.

A paper was read at the same meeting, on the condensation of several gases into liquids; by Mr. Faraday, Chemical Assistant in the Royal Institution. In this paper, Mr. Faraday describes the results of the application of the mode of condensation by which he had liquified chlorine, and Sir H. Davy, muriatic acid gas, and several other aëriiform bodies. He detailed a variety of experiments by which he produced liquids from *sulphuric acid, sulphuretted hydrogen, carbonic acid, nitrous oxide, cyanogen, ammoniacal gas, and muriatic acid*; and he intimated that he should continue his experiments, with a prospect of discovering some interesting and important general results.

April 17.—A paper was read on the application of the liquids produced by the condensation of gases as mechanical agents; by Sir Humphrey Davy, Bart., P. R. S. This was a kind of continuation of the former paper, by Mr. Faraday, in a practical view.

A paper was also read on the temperature, at considerable depths, of fresh-water lakes within the tropics; by Captain Edward Sabine.

At the same meeting a part of a paper was read by the Rev. W. Buckland, professor of mineralogy in the University of Oxford, in continuation of his former paper on the cave containing fossil bones, discovered at Kirkdale in Yorkshire; with an account of other caves in Yorkshire and Germany.

April 24.—A paper was read entitled an account of some experiments for determining the lengths of the invariable pendulum at various places in the South American station; by Captain Basil Hall, in a letter to Captain Henry Kater, F. R. S.

Geological Society.

April 4.—The Rev. J. J. Conybeare, read two notices on a recent ligneous petrification.

At the same meeting was read also a notice respecting a mass of Quartzose, Ferruginous Sandstone, occurring in the Limestone, near Bristol; by George Cumberland, Esq.

April 18.—A paper was read containing a description of two new species of *encrinus*, found in the mountain Limestone, near Bristol; by George Cumberland, Esq.

A paper was also read on the geology of Pulo Nias, an island on the western side of Sumatra; by Dr. Jack. Communicated by H. T. Colebrooke, Esq.

Another paper, by the same author, on the geology and geography of Sumatra, and the adjacent islands, was also communicated by Mr. Colebrooke.

New Patents Sealed in 1823.

To Thomas Hancock, of Goswell Mews, in the parish of St. Luke's, Old Street, in the County of Middlesex, patent cork-manufacturer, for an improvement in the preparation for various useful purposes of pitch and of tar, separately or in union, by admixture of other ingredients with either or both of them.—Sealed, 22d March. Six months for enrolment.

To Thomas Wickham, of the Town and County of the Town of Nottingham, lace-manufacturer, for a compound paste and liquid to be used for the purpose of improving and colouring lace and net, and all other manufactured articles made of flax, cotton, wool, silk, or any other animal or vegetable substances, whether the fabric of the same be composed of holes or interstices, or of open or close work, or otherwise; and to be applied in the process of getting up, dressing, or colouring the same.—Sealed, 24th March. Two months for enrolment.

To William Jessop, of Butterly Hall, in the County of Derby, ironmaster, for an elastic metallic piston or packing of pistons, to be applied either externally or internally to cylinders.—Sealed 27th March. Two months for enrolment.

To William Warcup, of Dartford, in the County of Kent, engineer, for an improvement or improvements in the construction of a machine called a mangle.—Sealed 3d April. Two months for enrolment.

To John Francis, of the City of Norwich, shawl and bombazine manufacturer, for improvements in the process of making or manufacturing a certain article or fabric composed of silk and worsted for useful purposes.—Sealed 12th April. Two months for enrolment.

To Samuel Hall, of Basford, in the County of Nottingham, cotton-spinner, for a certain method of improving lace, net, muslin, calico, and every other description

of manufactured goods, whose fabric is composed of holes or interstices; and also thread or yarn, as usually manufactured, of any kind, whether the said manufactured goods, or the said thread or yarn, be fabricated from flax, cotton, silk, worsted, or any other substance, or mixture of substances whatever.—Sealed 18th April. Six months for enrolment.

To William Southworth, of Sharples, in the County of Lancaster, bleacher, for certain machinery or apparatus adapted to facilitate the operation of dyeing calicoes, muslins, linens, and other similar fabrics.—Sealed 19th April. Two months for enrolment.

To William Caslon the younger, of Burton Crescent, in the County of Middlesex, proprietor of gas-works, for certain improvements in the construction of gasometers.—Sealed 10th May. Six months for enrolment.

To Jacob Perkins, of Fleet Street, in the City of London, engineer, for improvements in the mode of heating, boiling, or evaporating by steam, of fluids, in pans, boilers, or other vessels.—Sealed 17th May. Six months for enrolment.

To Edward Eyre, of Sheffield, in the County of York, fender-manufacturer, for an improvement in the manufacture of fenders of brass, iron, or steel.—Sealed 17th May. Two months for enrolment.

To Thomas Peel, of Manchester, in the County Palatine of Lancaster, Esquire, for a rotatory engine for the purpose of communicating motion by means of steam or other gaseous media.—Sealed 27th May. Six months for enrolment.

To Edward Ollerenshaw, of Manchester, in the County of Lancaster, hat-manufacturer, for a method of dressing and finishing hats, by means of certain machinery and implements to be used and applied thereto.—Sealed 27th May. Six months for enrolment.

D. H. M. S.		D. H. M. S.	
1 0 0 0	♀ illuminated 9 dig. on her western edge app. diam. 13''	10 23 14 0	☉ in conj. with ♄ long 2s 18o 58' Dif. dec 23' ☉ 23o 0' N. ♄ 22 37' N.
1 13 19 0	☾ in quadrature entering the last quarter.	11 0 0 0	♂ stat. long 3s 6o 59'.
6 11 58 0	☾ in conj. with ♄ long. 1s 17o 33'. Dif. dec. 6o 43' ☾ 21o 46' N. ♄ 15o 3' N.	11 7 29 0	☽ in conj. with ♀ long. 3s 29o 43'. Dif. dec. 2o 8' ☽ 20o 9' N. ♀ 22o 17' N.
7 7 13 0	☾ in conj. with ♂ long. 1s. 29o 16' Dif. dec. 4o 19' ☾ 24o 17' N. ♂ 19' 58' N.	15 3 23 0	☽ First quarter.
8 0 0 0	♂ in its descending node long. 3s 6o 27'	18 0 0 0	♂ in Aphelion.
8 11 47 0	Ecliptic Conjunction ● New Moon	21 0 2 0	☽ in conj. with ♄ long. 8s 7o 18' Dif. dec. 30' ☽ 25o 32' S. ♄ 26o 2' S.
8 13 29 0	☽ in conj. with ♄ long. 2s 18o 5'. Dif. dec. 3o 39' ☽ 26o 14' N. ♄ 22o 35' N.	21 19 11 0	☉ enters Cancer
9 0 0 0	☽ in Perigee.	23 0 5 0	Ecliptic opposition ☉ Ful. moon.
9 19 14 0	☽ in conj. with ♂ long. 3s. 6o 58'. Dif. dec. 2o 57' ☽ 25o 41' N. ♂ 22o 44' N.	23 17 52 0	☾ in conj. with ♄ long. 9s 9o 58' Dif. dec. 1' 13' ☾ 24o 40' S. ♄ 23' 27' S.
		24 0 0 0	☾ in Apogee.

N.B. All the above calculations are made to mean or clock time.

The waxing moon ☽—the waning moon ☾.

METEOROLOGICAL JOURNAL, APRIL, 1823.

1823.	Thermo.		Barometer.		Rain in in- ches.	1823.	Thermo.		Barometer.		Rain in in- ches.
	Higt.	Low.	+	—			Higt.	Low.	+	—	
APRIL						MAY.					
26	52o	42o	+,03	. .	,075	11	59o	49o	. .	—,11	,275
27	50	35	+,22	. .	,5	12	65	45	+,06	. .	. .
28	57	28	+,02	—,06	. .	13	61	44	+,03	. .	,075
29	56	34	+,20	. .	. .	14	58	37	+,09	. .	. .
30	60	29	stationary	. .	. .	15	64	41	+,02	. .	. .
MAY.						16	65	46	. .	—,11	. .
1	68	33	. .	—,02	. .	17	58	49	+,10	. .	,05
2	71	36	stationary	. .	. .	18	63	32	. .	—,08	. .
3	68	39	stationary	. .	. .	19	67	40	. .	—,23	. .
4	53	37	. .	—,03	. .	20	63	49	. .	—,04	. .
5	65	32	. .	—,12	. .	21	59	50	+,05	. .	,15
6	72	37	. .	—,06	. .	22	60	46	+,09	. .	,025
7	78	45	. .	—,01	. .	23	61	40	+,04	. .	,15
8	67	46	. .	—,14	. .	24	62	40	. .	—,03	,05
9	61	41	+,19	. .	,075	25	65	50	. .	—,02	. .
10	63	46	. .	—,15	. .						

Lower Edmonton.

C. H. ADAMS.

LITERARY NOTICES.

NEWCASTLE LITERARY AND PHILOSOPHICAL SOCIETY, May 8. A fine Egyptian Mummy Ram in an excellent state of preservation, though supposed to be upwards of 2,000 years old, was opened and dissected. It was encased in a very thick coat of pitch, surrounded by several hundred layers or bandages of linen cloth, and appeared to be entire with the hair and bones quite perfect, though the flesh and muscular parts were completely decayed away. It was purchased at the sale of the late Dr. Richie, of Edinburgh, and is now placed in the Museum of this Institution.

EDINBURGH WERNERIAN SOCIETY, May 3. An interesting Paper was read by Dr. Ramsay, giving some description of Macquarrie Island. It is situated in long. 159° 28' E. lat. 54° 20' S. and is not large, being but from two to four miles broad. It is mountainous; the elevated tracts rising from 700 to 1000 feet above the level of the sea. There are abundance of birds upon the island, but no quadrupeds; neither are there any trees or shrubs, and though the landing is not good, from the violence of an almost constant surf, yet the island is considered valuable in a commercial point of view, for the oil which is obtained from the sea-cow.

AFRICA—The Sierra Leone newspapers contain a very interesting account of the travels of a Tartar, who, at the age of nearly seventy, had found his way from Tripoli through the heart of Africa, to Cape Coast Castle, by a route that no white man probably ever traversed. He is a native of Astracan, by name Wargece, and at the age of 15 was made prisoner by the Turks. On his last tour, which lasted nearly two years, he visited Timbuctoo, which he described with minuteness.

GAS LIGHTS. The following statement will shew the wonderful progress made by the Gas Light Companies in the

few years that have elapsed since their establishment. The length of streets already lighted with gas in London, is 215 miles; and the three principal companies light 39,504 public lamps, and consume annually about 33,158 chaldron of coals!

Sir Everard Home, Bart. has nearly ready for publication a third volume of Lectures on Comparative Anatomy.

Mr. H. Ellis is about to publish Original Letters, chiefly illustrative of English History, from autographs in the British Museum and other collections.

The Geography, History, and Statistics of America and the West Indies, originally published at Philadelphia, are reprinting in this country.

Mr. T. Clarke, of Glasgow, is preparing "a New System of Chemical Nomenclature." The names adopted in this system are so similar to the present names, as to be easily recognizable by those acquainted with the latter, while the simplicity of the plan is such, that any person having a general knowledge of chemistry, may acquire a knowledge of the whole nomenclature, with almost all known combinations, by a few hours' application.

Richard Godson, Esq. of the Inner Temple, Barrister at Law, has just published a Practical Treatise on the Laws of Patents for Inventions and Copyrights, with an introductory book on monopolies, illustrated with notes of the principal cases. We shall probably notice this work in a future number.

The Russian Admiral, Krusenstern, has published a formal contradiction of the statement, which appeared first in the Continental Journals, of his having sent word to Paris and London of the arrival of Captain Parry on the coast of Kamtschatka. Admiral Krusenstern declares that he has never written a line on the subject to any person whatsoever.

LONDON:

SHACKELL AND ARROWSMITH, JOHNSON'S-COURT, FLEET-STREET,

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